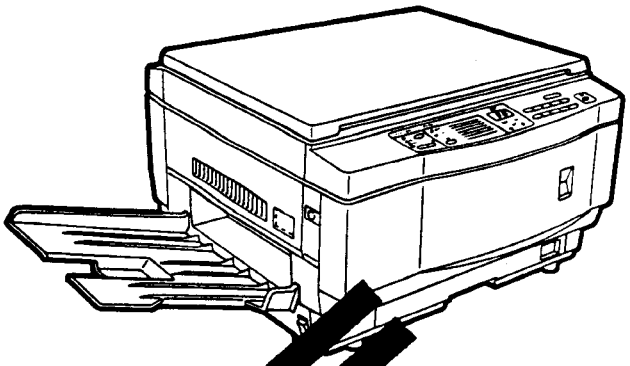
SF-7320
SF-7370

SHARP SERVICE MANUAL

CODE: 00ZSF7370SM-E



SF-7320
MODEL SF-7370

M.O. MASTER COPY

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SHARP CORPORATION

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What the SF-7370 differs from the SF-7350

FEATURES

The following shows the comparison of the SF-7370 features vs. SF-7350.

Model	SF-7370	SF-7350
Basic performance		
Copy speed	8½ x 11 (A4) or smaller	8½ x 11 (A4) or smaller
(Normal)	14 copies/minute	13 copies/minute
(Reduction)	12 copies/minute	12 copies/minute
First copy	7.5 seconds	8 seconds
Warmup time	35 seconds	45 seconds
Magnification ratio	Zooming feature (64% ~ 124%)	
	Fixed ratio	
	(Two step reduction) 64%, 75% (inch series)	64%, 75% (inch series)
	70%, 80% (AB series)	70%, 80% (AB series)
	(Single step enlargement) 124% (inch series)	124% (inch, AB series)
	122% (AB series)	
Exposure system	Auto/manual/photo (Employment of the Scorotron method)	Auto/manual
Operations		
Operation panel	Use of normal keyboard	Use of key sheet
Noise reduction feature (during standby mode)	Incorporated (the fan motor stops after a lapse of 60 seconds after the copy operation has completed.)	Not incorporated.
Serviceability		
Toner concentration adjustment (initial setting)	Automatic	Manual

Model	SF-7320	SF-7300
Basic performance		
First copy speed	7.5 seconds	8 seconds
Warmup time	35 seconds	45 seconds
Exposure system	Auto/manual/photo (Employment of the Scorotron method)	Auto/manual
Operationability		
Operation panel	Use of normal keyboard	Use of key sheet
Noise reduction feature	Incorporated	Not incorporated
Serviceability		
Toner concentration adjustment	Automatic	Manual

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[1] BASIC SPECIFICATIONS

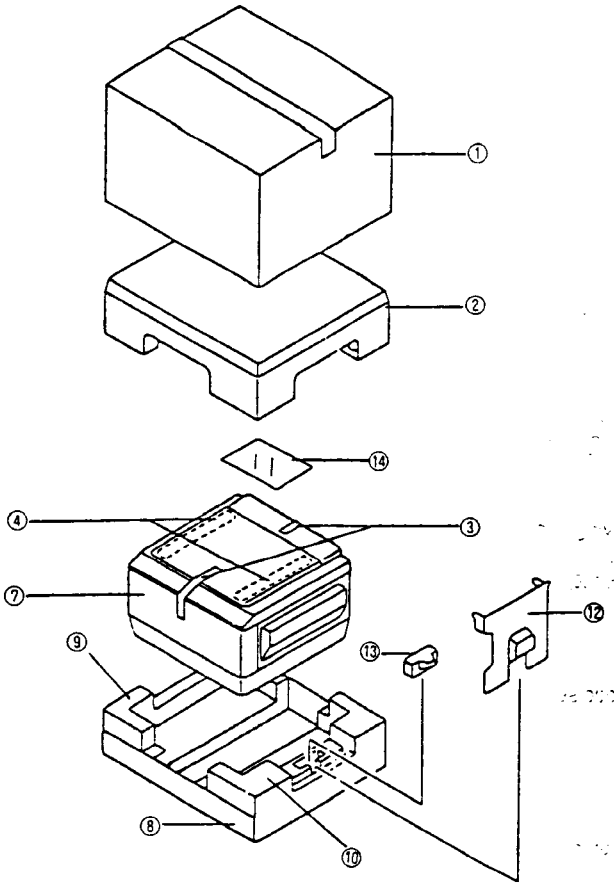
Model	SF-7370	SF-7320
Type	Desktop, stable original table	
Copying system		
Original kind	Sheet	
Original size	Maximum: 10" x 14" (inch series), B4 (AB series)	
Original alignment	Front frame, left side aligned	
Copy size	10" x 14" ~ 8-1/2" x 5-1/2" (inch series) B4 ~ A5 (AB series)	
Copy speed	Cassette feed and multi-bypass stacker	
	Paper size / Normal / Reduction (x0.64) / Enlargement (x1.24)	Normal
	8½" x 14" (B4) / 11 / 12 / 10	11
	8½" x 11" (A4) / 14 / 12 / 10	13
	8½" x 5½" (B5) / 14 / 12 / 10	13
First copy speed	7.5 seconds	7.5 seconds
Warmup time	35 seconds	
Multicopy	1 ~ 99 copies, countdown type, with auto repeat	
Magnification ratio	Zooming:64% ~ 124% (1% increment) Fixed ratio:64%, 75%, 100%, 124% (inch series) 70%, 80%, 100%, 122% (AB series)	100% only
Paper feed system	Single cassette automatic feed (approx. 250 sheets) and manual feed. Multi-manual feed (approx. 50 sheets) with SF-MF11 option.	
Exposure system	Slit exposure with stationary platen and moving light source. Automatic exposure: Limited area exposure. Manual exposure (photo mode): 9 steps (ex.1.0 ~ ex.5.0)	
Developing system	Two component magnetic brush development Toner: Positively charged. Carrier: Negatively charged.	
Toner supply	Automatic toner control system, with magnetic sensor.	
Photoconductor	OPC drum (50ϕ)	
Paper separation system	Separation with the remover tape and separation roller.	
Cleaning system	Blade cleaning	
High voltage units		
Charge system	Negative DC corona, with the screen grid controlled Scorotron system	
Transfer system	Negative DC corona.	
Discharge system	Optical discharge by means of a discharge lamp	
Fusing system	Heat roller type Upper heat roller: Teflon coated Lower heat roller: Silicon	
Light source	Halogen lamp	
Power requirements	100, 110, 220 VAC, 50/60Hz 120, 127 VAC, 60Hz. 200, 240 VAC, 50Hz Power supply unit:50/60Hz universal (49 ~ 61Hz) Rated voltage ±10%	Cycle: Rated cycle ±2%. Rated voltage ±10%.
Power consumption	150W, standby. 1400W, operating. 100W, power save	
Physical dimensions	577mm wide x 530mm deep x 340mm high	577mm wide x 530mm deep x 340mm high
Weight	Approximately 34.5Kg with drum and developer.	Approximately 33.5Kg with drum and developer.

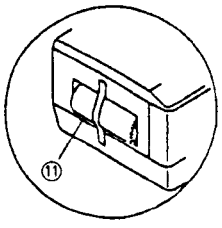
OPTIONS

Name	Type	Model
Universal cassette	Inch series	SF-732UA
	AB series	SF-732UB
Personal counter	Counter	SF-71A
	Socket	SF-71B
Desk	—	SF-720D2
Multi-bypass stacker	—	SF-MF11

[2] UNPACKING AND INSTALLATION

1. Unpacking





List of packing material and accessories

	Parts name	Q'ty
1	Packing case	1
2	Top cushion	1
3	Taping	2
4	Original cover protection material	2
5	Copier	1
6	Paper receive tray poly bag	1
7	Copier poly sheet	1
8	Bottom case	1
9	Bottom case cushion (L)	1
10	Bottom case cushion (R)	1
11	AC cord sleeve	1
12	Paper receive tray	1
13	Waste toner container	2
14	Instruction manual unit	
	Instruction manual	1
	Dust cover	1
	Vinyl gloves	1
	Warranty form	1
	Corona cleaner	1
	Installation report form	1
	Installation procedure	1

2. Installation

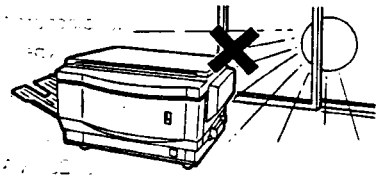
Installation requirements:

Please note the following requirements when installing the copier.

(1) Machine Environment

① Avoid installation in direct sunlight or bright locations near a window.

Direct sunlight may cause the plastic components and the original cover to deform. Frosted glass may also produce the same effect.



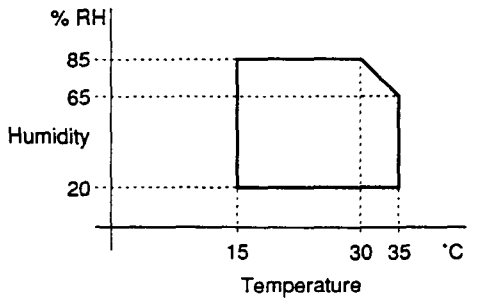
② Avoid installation in a hot, damp area or where rapid changes in humidity occur (for example; near an air conditioner).

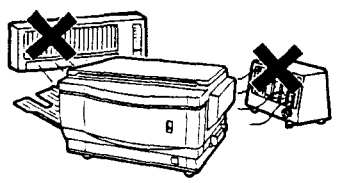
This may cause paper to dampen or moisture to collect inside the copier, leading to misfeeds and a deterioration in copy quality.

The recommended environmental conditions are:
20 to 25 degrees C (68 to 77 degrees F.), 65±5%RH.

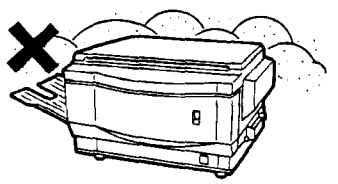
The nominal environment conditions are:
15 to 30 degrees C. (59 to 86 degrees F.), 20 to 85%RH.

If the copier is to be installed in an area of higher temperature, the humidity must be lower. Example; If the temperature is 35 degrees C. (95 degrees F), the humidity should be 65%.

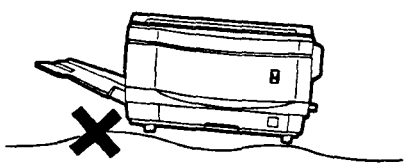




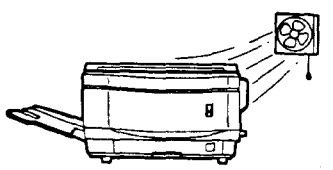
③ **Avoid installation in a place where dust or vibration is encountered.**
Dust deposits inside of the copier may lead to a deterioration of copy quality or machine trouble.



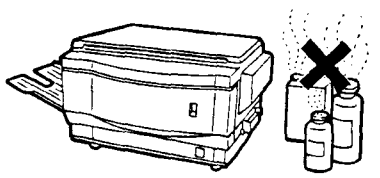
④ **Do not install the copier on an unstable or uneven surface.**
The copier must be placed on a level surface to permit proper operation.



⑤ **Avoid installation in a place where the ventilation or air circulation is poor.**



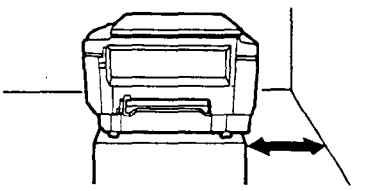
⑥ **Never install the copier near flammable materials or in the presence of ammonia fumes.**
Installation near a diazo copy machine may lead to a deterioration of copy quality or a machine malfunction.



⑦ **Install the copier near the wall outlet, do not use an extension cord.**

(2) Space around the copier

The copier requires at least 10cm (4") of clearance between the rear side and the wall. This space is required for proper cooling fan ventilation. Adequate working space around the machine should also be allowed for ease of operation and service.



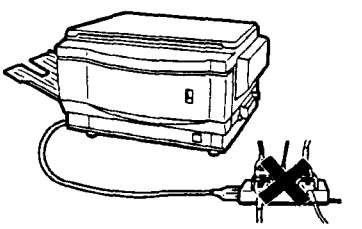
(3) Copier table

Install the machine on a level surface. Place a water level (UKOGM0054CSZZ) in the center of the original glass and check level front to rear and side to side.

NOTE: The toner density and copy quality may be affected unless the machine is installed on a level surface.

(4) Power source

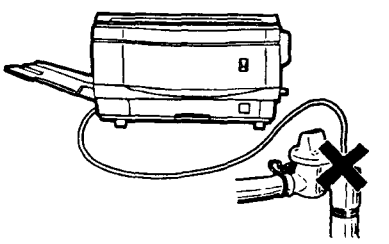
① **The power supply line should have a capacity of more than 15A, capable of supplying more than 90% of the rated voltage at full load.**



② **Do not use an extension cord or operate any other equipment from the same wall outlet.**

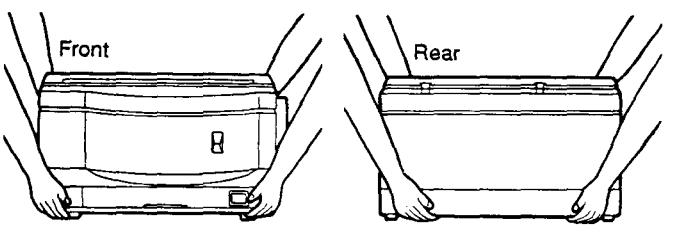
(5) Ground connection

① **Use a properly grounded (three prong) wall outlet that meets all national and local electrical code specifications.**



How the copier machine is carried

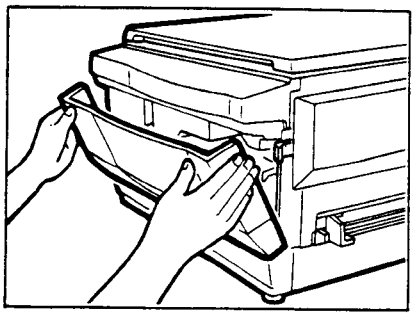
When moving the copier, remove the receiving tray and carry it by holding the identation in the bottom of the machine.



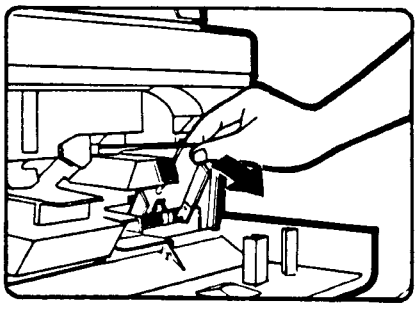
3. Releasing locks and installing supplies

(1) Removing the developer unit

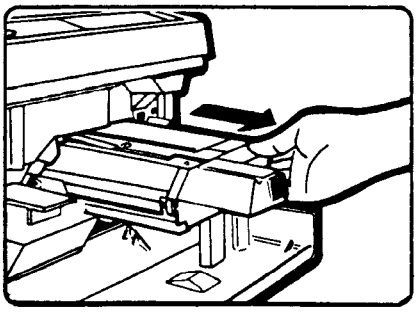
① Open the front panel.



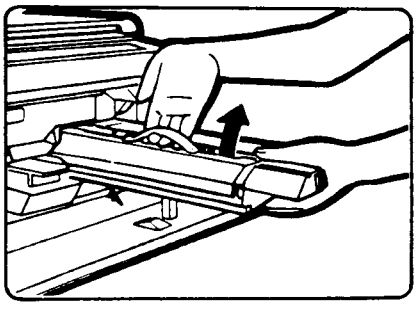
② Pull the developer unit lever towards you.



③ Gently pull out the developer unit by holding the handle until it stops.



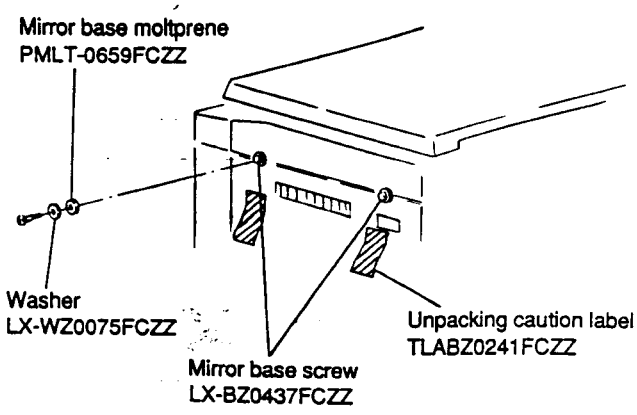
④ Hold the carry handle of the developer unit and remove it.



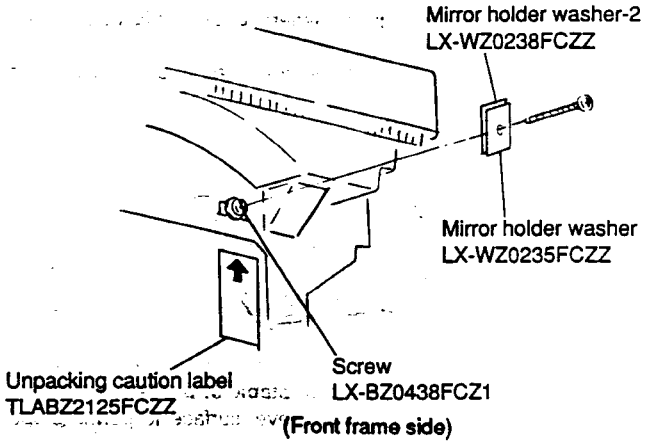
NOTE: Unless the developer unit is held by the handle, the developer unit may not come out.

(2) Releasing the optical block lock

① Remove mirror base unit (No. 2/3) holding screws.

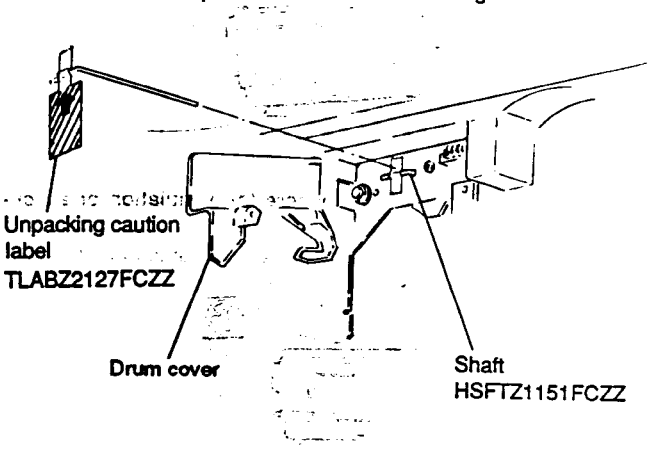


② Remove mirror base (No.4/5) holding screw (SF-7370 only).



③ Removal of the lens base holding shaft (SF-7370 only).

a. Remove the tape, then the lens base holding shaft.



(3)-A Installing the drum

(In some of the machines, depending on location, the drum has already been installed at the factory. Execute (3)-B if the drum was installed in the copier.)

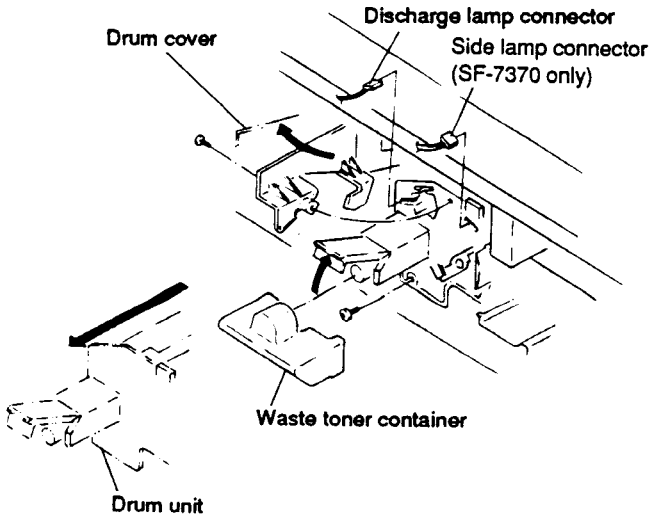
(Machines without drum installed)

① Push the frame open lever to open the clam shell mechanism.

② Lift up the lever to remove the waste toner container.

③ Open the drum cover (one screw).

④ Unfasten two connectors and one screw, and remove the drum unit. (SF-7320 has only one connector)

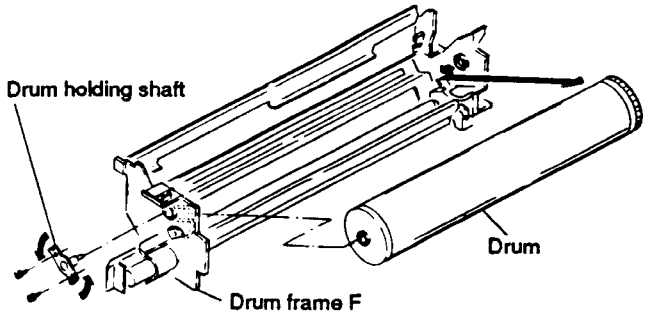


⑤ Remove the drum holding shaft from the frame F.
Remove two screws to remove the drum and rotate the shaft counterclockwise to remove it.

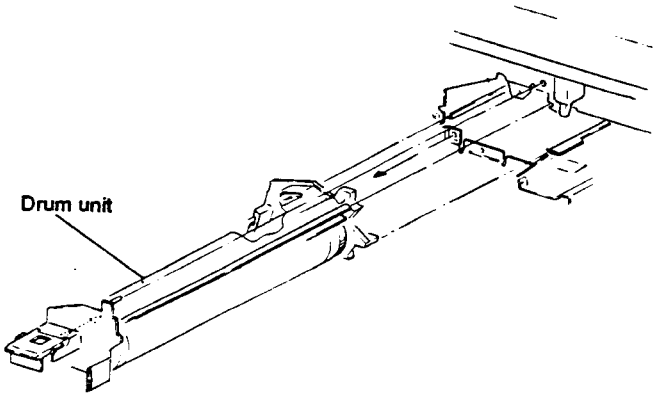
⑥ Remove the drum protective sheet and mount the drum in the drum frame without touching the drum surface with your fingers.

NOTE: Do not remove setting powder from the drum or blade. Use care when handling the drum to avoid scratching the surface.

⑦ Install the drum holding shaft to the frame F.

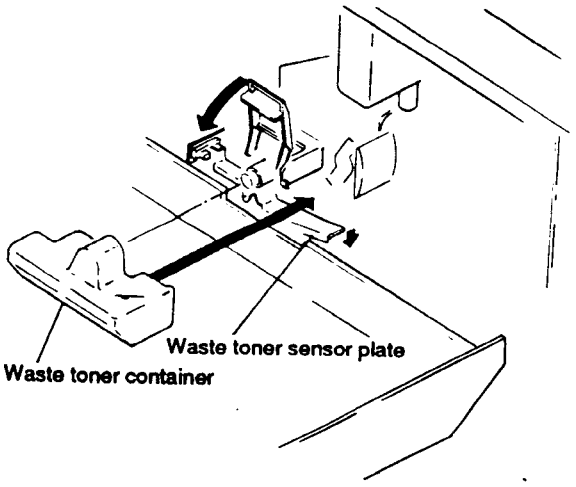


⑧ Install the drum unit along the guide in the copier.



⑨ Fasten two connectors. (SF-7320 only one connector)
Close the drum cover.
Secure the drum unit with two screws.

⑩ Close the unit.
Hold the waste toner container sensor plate down, and install the waste toner container.

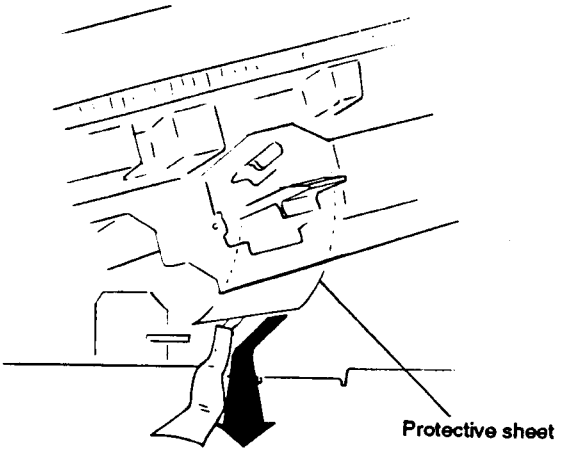


(3)-B Remove the drum protect sheet

(Machine with drum installed)

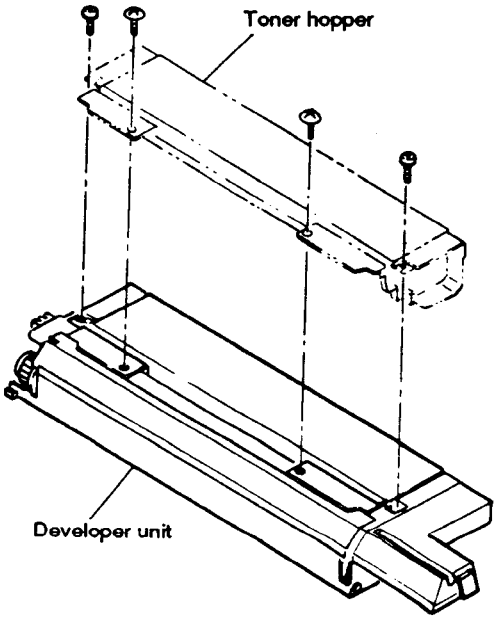
① Push down on the frame open lever to open the clam shell mechanism.

② Gently remove the drum protect sheet.



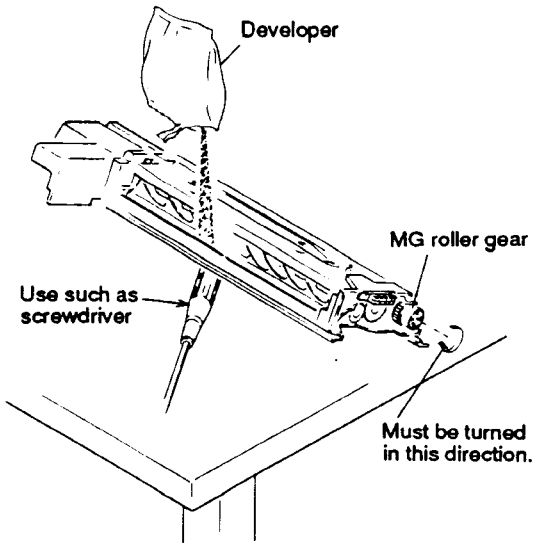
(4) Installing developer

① Remove the toner hopper from the developer unit (four screws).



② Place a screwdriver handle under the bottom of the developer unit and tilt the developer unit as shown in fig. 1.

③ Load a full bag of developer into the developer unit while rotating the MG roller gear in the arrow direction.



IMPORTANT: It is important that the MG roller gear be turned in the arrow direction, otherwise, developer may leak under the MG roller.

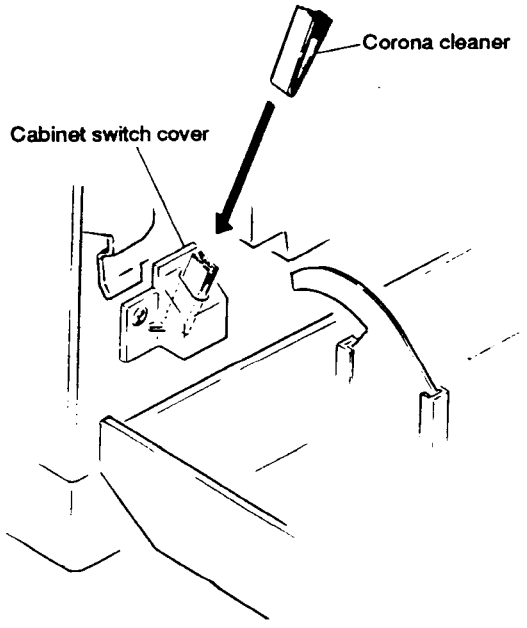
④ Install the toner hopper on the developer unit.
Do not install the developer unit in the machine at this time.

(5) Toner control sensor (TCS) level adjustment

① Make sure that the developer unit is not installed in the copier.
Note: Because the main motor start to run for this machine immediately after the power on and the toner is then started to supply if the toner concentration is low, it may mess the toner concentration when the toner is in the toner hopper. So, carelessly turning the power on with an unadjusted developer unit installed in the machine, it affects the toner concentration. To avoid this, you must observe the following steps when making TCS adjustment for a new developer.

② Turn power on.

③ Turn on the cabinet switch (CSW) using the corona cleaner.
(The trouble status "CH" will flash.)

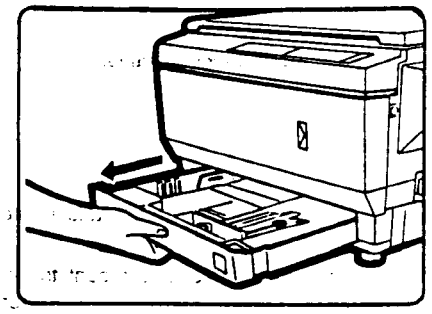


④ Execute test command 25 but do not push the PRINT switch.
C → 0/◊ → 0/◊ → C → 2 → 5 → CSK (paper selection)

⑤ Install the developer unit in the copier.

⑥ Push the PRINT switch.
Test command 25 starts and stirs the developer for a period of three minutes.

⑦ Push the PRINT switch. Then, the toner level of the developer is scanned by the main PWB. While the toner is being stirred, the level of the toner is displayed on the operation panel window within 01 to 99.
While the developer is being adjusted automatically, take out the cassette and remove the protect tape.



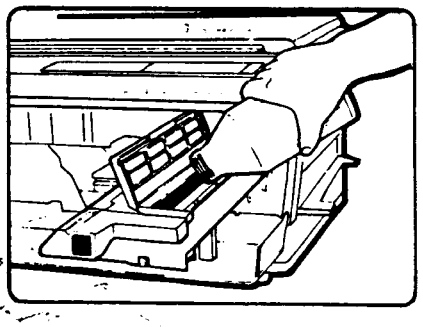
If the test command 25 (toner sensor TCS output level adjustment) was cancelled in a middle of the toner stirred, the toner level may not be recognized.

Test command 25

- Stirring the developer tank: 0/◊ → 0/◊ → 2 → 5 → (PSW)
- Automatic developer adjustment: 0/◊ → 0/◊ → 2 → 5 → CSK (paper selection) → (PSW)

(6) Installing toner

① Load toner in the toner hopper after the completion of the toner control sensor (TCS) level adjustment.



(7) Programming the mini-maintenance counter

The mini-maintenance counter needs to be programmed according to the period of the maintenance.

(Setup method)

① Execute test command 72.
C → 0/◊ → 0/◊ → C → 7 → 2 → PSW

② When test command is executed, the presently used copy kit or the programmed number for the maintenance lamp (see table below) comes displayed with the READY lamp on.

③ After the maintenance lamp has turned active, enter the number appropriate to the copy kit or programmed maintenance lamp control number using one of keys of 1 to 4 and press the PRINT switch. With this, the number is stored in the memory and the READY lamp turns off.

Entry	Developer lamp DVPL active after		Maintenance lamp MAINTEL active after	
	Black	Color	Mini-maintenance	Normal maintenance
1	30000 copies	5000 copies	10000 copies	30000 copies
2	30000 copies	5000 copies	15000 copies	30000 copies
(3)	30000 copies	5000 copies	30000 copies	30000 copies
4	Does not turn on	5000 copies	Does not turn on	Does not turn on

Press the CLEAR key twice to terminate the test command.
The maintenance lamp comes active after the mini-maintenance or maintenance counter has turned over the limit.
The mini-maintenance counter can be cleared to "0" when test command 72 is executed.

④ Push the CLEAR key twice to terminate the test command 79.

(8) Confirming the model type and local mode program

(Check method)

① Execute test command 79.
C → 0/◊ → 0/◊ → C → 7 → 9 → PSW

② When this test command is executed, the model type and the local mode setup data currently stored in the memory (see the table below) are displayed, and the READY lamp turns on.

③ You will now enter a two-digit number shown in the table after the READY lamp turns ON. The number must match the model type and the local mode setting.
Push the PRINT switch to store the number in the memory.
The READY lamp goes out after the number is stored.

	SUK	Indonesia	AB series	SEC	Inch series
SF-7320	1	25	5	6	7
SF-7370	11	35	15	16	17

Indonesia: When this setting is chosen, "CH" will come displayed in the multicopy window and the machine may not produce any copy, if other than the black cartridge is used.

④ Push the CLEAR key twice to terminate the test command 79.

(9) Corona wire cleaning

a. Main corona

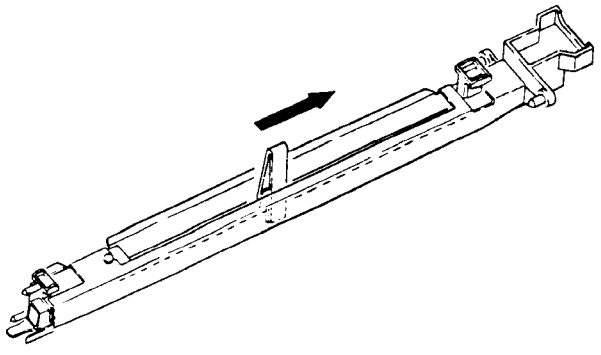
① Turn the main power OFF.

② Open the front cover and pull the main corona unit slowly out.

③ Hold the corona wire between the tips of the corona cleaner, and wipe the wire moving the cleaner in the direction indicated on the corona handle.

- Put a little alcohol on the cleaner if the corona wire is particularly dirty.
- Do not bend or pull the wire.

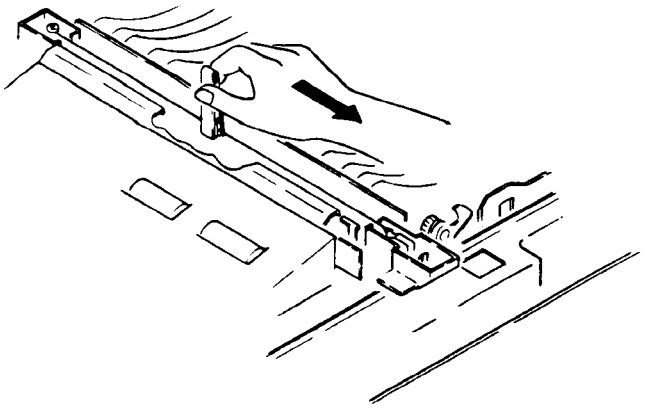
④ Push the main corona unit back into place and closes the front cover.



b. Transfer corona

① Push down on the frame open lever to open the clam shell mechanism.

② With the transfer corona unit still installed, clean the transfer corona wire with the provided cleaner.



4. Installing the multi-bypass stacker

Installation procedure refer to the multi-bypass unit installation manual.

5. Copy check/Exposure adjustment

Copy check and Exposure adjustment procedure refer to the section [12] 1~4.

[3] SUPPLIES

Since lives of consumables are determined by presumption, their actual lives may differ subject to operating conditions.

SF-7320/7370 Supply system table (For SEC/SECL)

No.	Name	Description	Life	Product name	Pack unit	Remark
1	Drum	OPC Drum x 1 Remover sheet x 1 Blade x 1	30K	SF-730DR	10	
2	Developer (Black)	Developer (400g) x 10 (Aluminum pack)	30K (x 10 pcs.)	SF-730LD1	1	(SF-730DV1) x 10 = (SF-730LD1)
3	Developer (Red) (Blue) (Brown) (Green)	Developer (400g) x 10 (Bottle)	5K (x 10 pcs.)	SF-730LD2 SF-730LD3 SF-730LD4 SF-730LD5	1	(SF-730DV2 – 5) x 10 = (SF-730LD2 – 5)
4	Toner	Toner (260g) x 10	6K (x 10 pcs.)	SF-730MT1	1	(SF-730NT1) x 10 = (SF-780MT1)
5	Toner	Toner (130g) x 10	2.5K (x 10 pcs.)	SF-730LT2 SF-730LT3 SF-730LT4 SF-730LT5	1	(SF-780T2 – 5) x 10 = (SF-780LT2 – 5)
6	Color developer kit	Developer (400g) x 1 Toner (130g) x 1 Developer x 1 Storage case x 1		SF-732K2 SF-732NK3 SF-732NK4 SF-732NK5	1	
7	Heat roller kit	Teflon roller (Upper) x 1 Teflon roller (Lower) x 1 Fusing separation pawl x 3 Lower cleaning roller x 1 Slide bearing x 2	60K	SF-732HR	5	Changed points from SF-730HR • Silver stone is applied to the upper heat roller. • Two slide bearings are added.

SF-7320/7370 Supply system table (For SEEG/SUK)

No.	Name	Description	Life	Product name	Pack unit	Remark
1	Drum	OPC Drum x 1 Remover sheet x 1 Blade x 1	30K	SF-730DR	10	
2	Developer (Black)	Developer (400g) x 10 x 10 (Aluminum pack)	30K (x 10 pcs.)	SF-730LD1	1	(SF-730DV1) x 10 = (SF-730LD1)
3	Developer (Red) (Blue) (Brown) (Green)	Developer (400g) x 10 x 1 (Bottle)	5K	SF-730DV2 SF-730DV3 SF-730DV4 SF-730DV5	10	
4	Toner	Toner (260g) x 10 x 10	6K (x 10 pcs.)	SF-730CT1	1	(SF-730ST1) x 10 = (SF-780CT1)
5	Toner	Toner (130g) x 10 x 1	2.5K	SF-730T2 SF-730T3 SF-730T4 SF-730T5	10	
6	Color developer kit	Developer (400g) x 1 Toner (130g) x 1 Developer x 1 Storage case x 1		SF-732K2 SF-732K3 SF-732K4 SF-732K5	1	
7	Heat roller kit	Teflon roller (Upper) x 1 Teflon roller (Lower) x 1 Fusing separation pawl x 3 Lower cleaning roller x 1 Slide bearing x 2	60K	SF-732HR	5	Changed points from SF-730HR • Silver stone is applied to the upper heat roller. • Two slide bearings are added.

SF-7320/7370 Supply system table (For other EX)

No.	Name	Description		Life	Product name	Pack unit	Remark
1	Drum	OPC Drum Remover sheet Blade	x 1 x 1 x 1	30K	SF-730DR	10	
2	Developer (Black)	Developer (400g) (Aluminum pack)	x 10	30K (x 10 pcs.)	SF-730LD1	1	(SF-730DV1) x 10 = (SF-730LD1)
3	Developer (Red) (Blue) (Brown) (Green)	Developer (400g) (Bottle)	x 10	5K (10 pcs.)	SF-730LD2 SF-730LD3 SF-730LD4 SF-730LD5	1	(SF-730DV2 ~ 5) x 10 = (SF-730LD2 ~ 5)
4	Toner	Toner (260g)	x 10	6K (x 10 pcs.)	SF-730CT1	1	(SF-730ST1) x 10 = (SF-780CT1)
5	Toner	Toner (130g)	x 10	2.5K (x 10 pcs.)	SF-730LT2 SF-730LT3 SF-730LT4 SF-730LT5	1	(SF-780T2 ~ 5) x 10 = (SF-780LT2 ~ 5)
6	Color developer kit	Developer (400g) Toner (130g) Developer Storage case	x 1 x 1 x 1 x 1		SF-732K2 SF-732K3 SF-732K4 SF-732K5	1	
7	Heat roller kit	Teflon roller (Upper) Teflon roller (Lower) Fusing separation pawl Lower cleaning roller Slide bearing	x 1 x 1 x 3 x 1 x 2	60K	SF-732HR	5	Changed points from SF-730HR • Silver stone is applied to the upper heat roller. • Two slide bearings are added.

(Option)

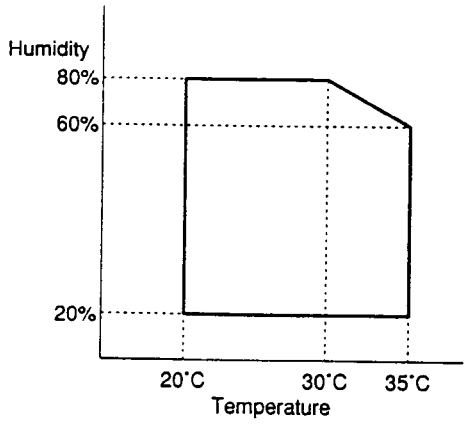
1. Multi-paper feed unit — SF-MF11: Common with the SF-7300/7350
2. Semi-universal cassette — SF-732UA (Inch series): Newly provided (with change in the cassette and the base plate.)
   SF-732UB (AB series): Newly provided (with change in the cassette and the base plate.)

1. Machine environments

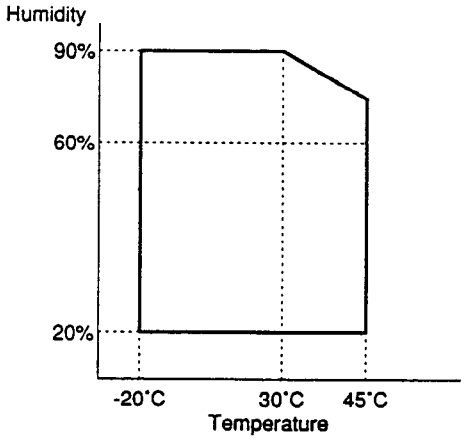
The following environmental conditions are required for copy quality assurance and machine operation conditions.

(1) Standard conditions
Temperature: 20 ~ 25°C
Humidity: 65±5%RH

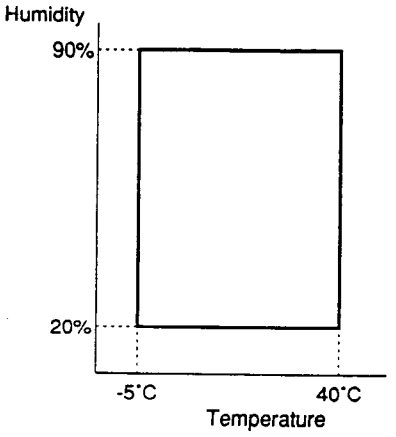
(2) Operating conditions



(3) Transportation conditions



(4) Supply storage conditions



2. Electrical characteristics

Operating voltage range:	±10% of the rated voltage.
Operating frequency range:	±2% of the rated frequency.
Instant power down:	20msec (50Hz), 6.6msec (60Hz)

3. Noise level

During copy:	62dB
During standby:	45dB

4. Special paper

Basically, it would be possible to use the paper normally used for the copier (OHP film, label, second original, color paper), but there is a need of testing the usability of such paper as its kinds largely differ depending on the country it used, because a variation might be encountered as to the fusability and transferability even if the paper has the same thickness.

5. How to identify a lot number

- Drum

  ○ ○ ○ ○ ○ ○
  1 2 3 4 5 6

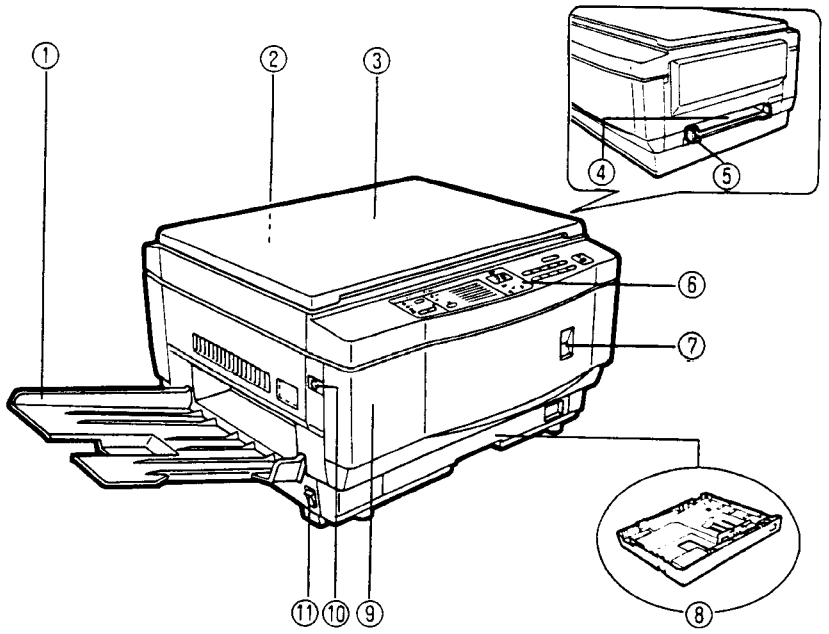
  1: Sensitivity of the photoconductor
  2: Model conforming code
  3: Last digit of year
  4: Manufacture month
  5, 6: Lot number

- Developer, toner

  1: B → Toner
  M W → Developer
  2, 3: Manufacture month
  4, 5: Manufacture day
  6: Last digit of year
  7: Lot number

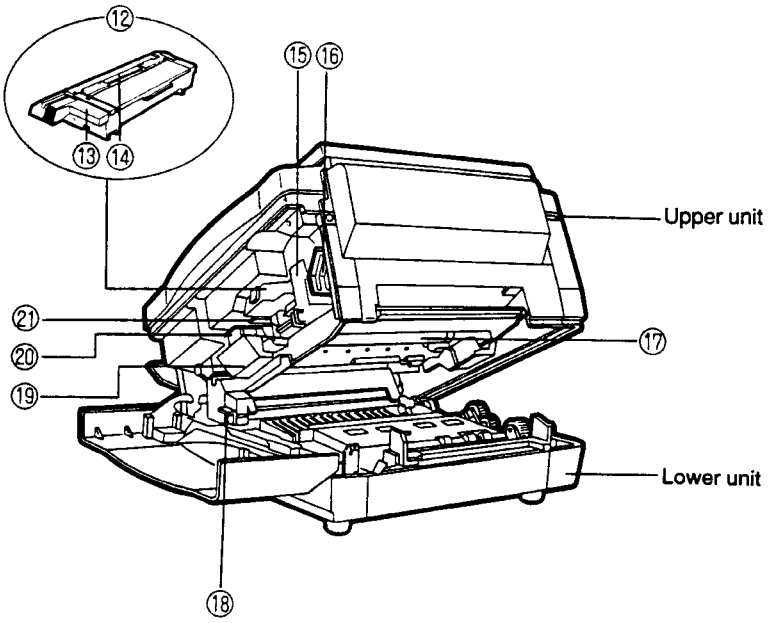
[4] EXTERNAL AND INTERNAL STRUCTURES

1. External parts



①	Copy receiving tray	②	Original table	③	Original cover
④	Manual feed table	⑤	Manual feed guide	⑥	Operation panel
⑦	Color check window	⑧	Cassette	⑨	Front door
⑩	Front door open button	⑪	Power switch		

2. Internal parts

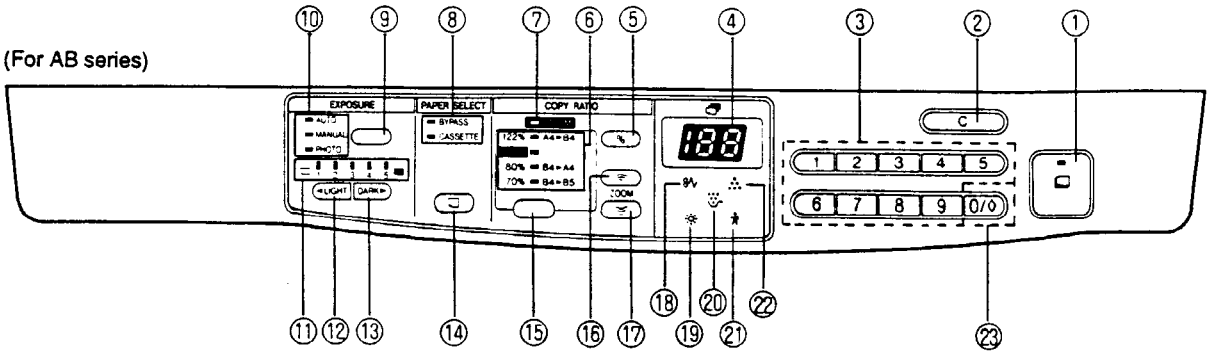


⑫	DV unit	⑬	DV unit handle	⑭	DV unit carry handle
⑮	DV unit lever	⑯	Clam shell open lever	⑰	OPC drum
⑱	Fuser accessing lever	⑲	Waste toner container	⑳	Waste toner container holding lever
㉑	Corona unit				

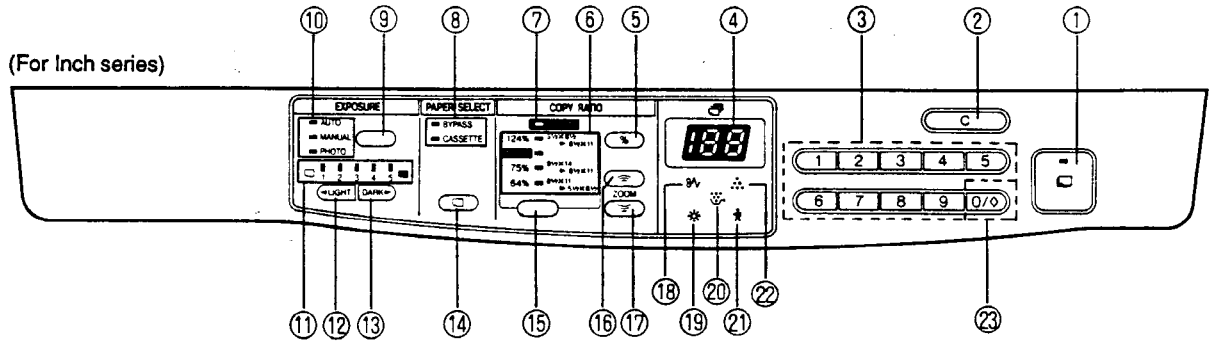
3. Operation panel

SF-7370

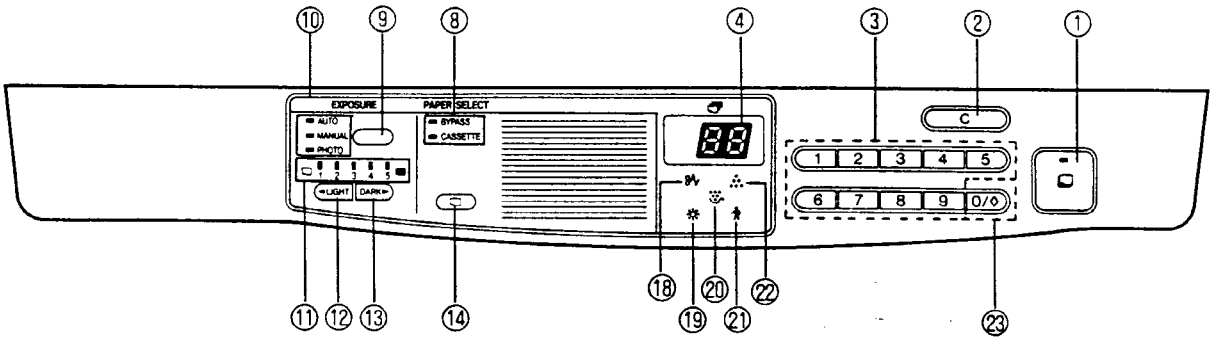
(For AB series)



(For Inch series)

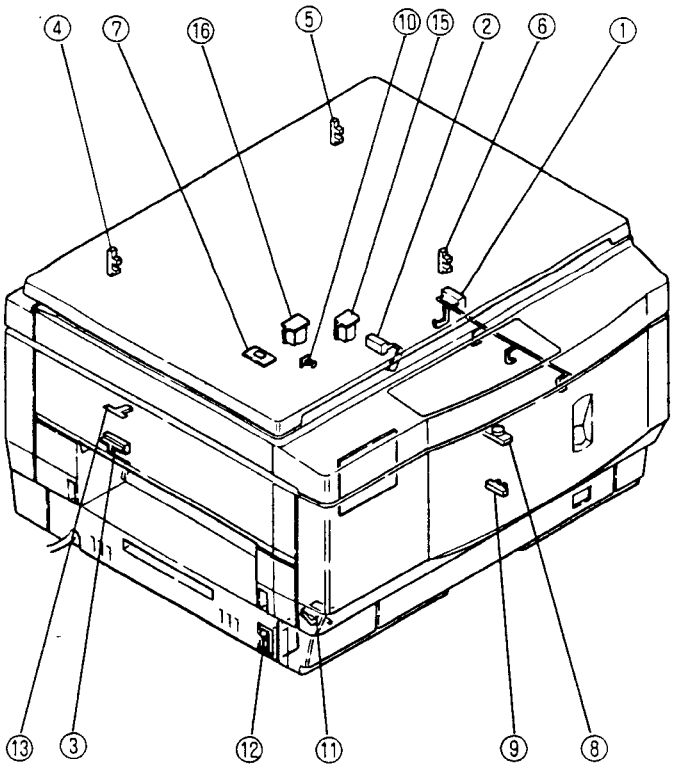


SF-7320

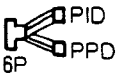


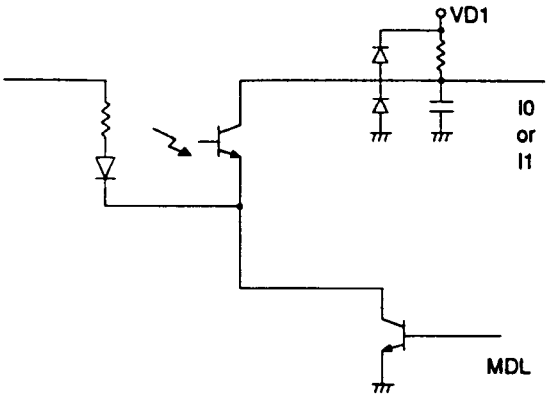
No	Name	No	Name	No	Name
①	Print switch	②	Clear key	③	Numeric keypad
④	Copy number window	⑤	Copy ratio select key	⑥	Copy ratio indicator
⑦	Zoom mode indicator	⑧	Paper select indicator	⑨	Exposure mode select key
⑩	Exposure mode indicator	⑪	Manual exposure level indicator	⑫	Manual exposure control key (lighter)
⑬	Manual exposure control key (darker)	⑭	Paper select key	⑮	Copy ratio select key
⑯	Zoom ratio select key (larger)	⑰	Zoom ratio select key (smaller)	⑱	Misfeed indicator
⑲	Replace developer indicator	⑳	Waste toner replace indicator	㉑	Maintenance indicator
㉒	Toner replenish indicator	㉓	Zero/recall key		

4. Switches, sensors, detectors, and solenoids



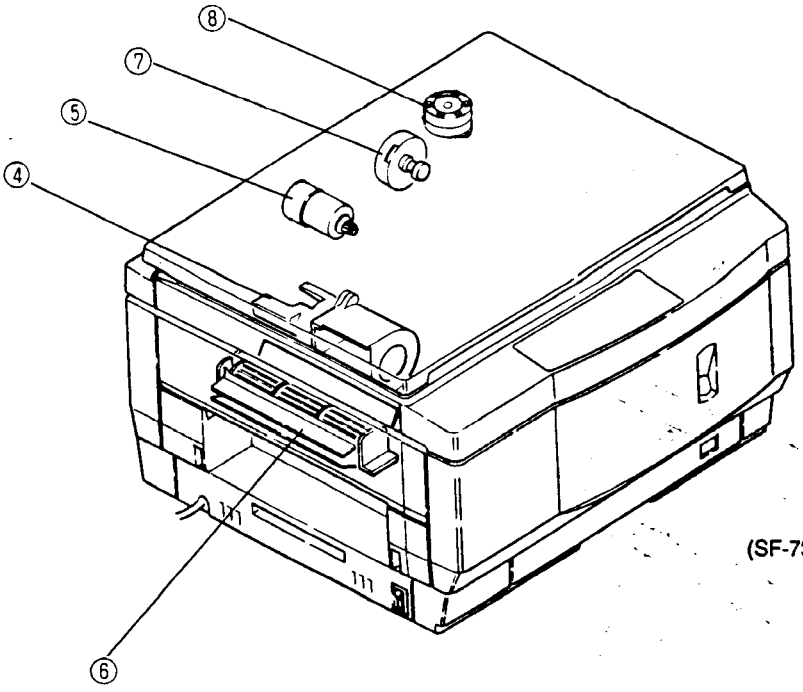
PID and PPD are available as a pair under the parts name of PPID.



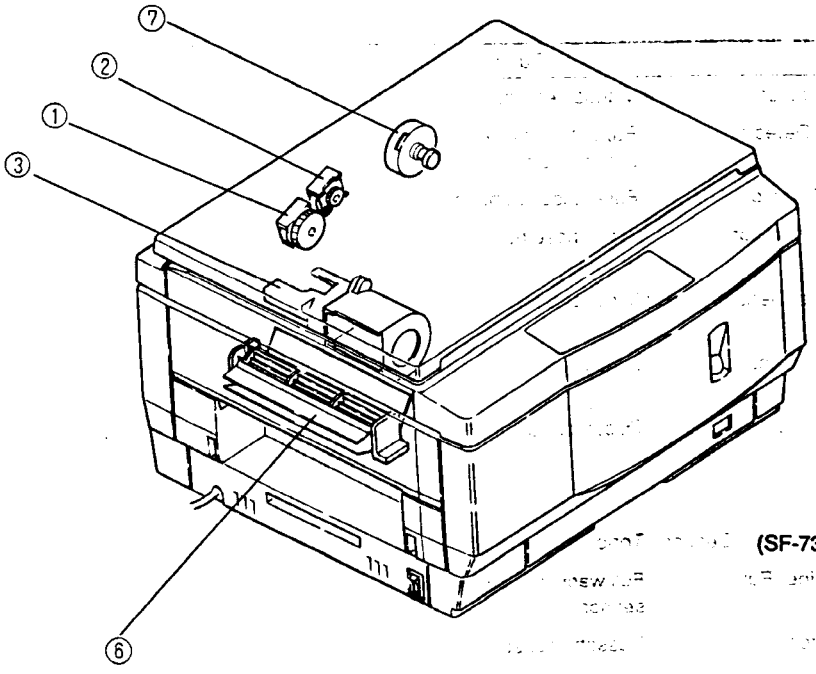


No.	Name		Function	Type	Contact/output
①	PID	Paper in Detector	Manual feed paper detector	Photoswitch	Low when paper is on.
②	PPD	Paper Pass Detector	Paper feed block paper path detector	Photoswitch	High when paper is on.
③	POD	Paper Out Detector	Fuser block paper detector	Photoswitch	Low when paper is on.
④	MHPS	Mirror Home Position Sensor	Mirror base home position sensor	Transmissive type photosensor	High when on the home position.
⑤	MORS	Mirror Overrun Sensor	Mirror base overrun sensor	Transmissive type photosensor	High when overrun.
⑥	LPS	Lens Position Sensor	Lens home position sensor	Transmissive type photosensor	Low when a timing slit is sensed.
⑦	AES	Auto Exposure Sensor	Document contrast sensor	Photodiode	Low signal output when document contrast is high. High output when document contrast is low.
⑧	TCS	Toner Concentration Sensor	Toner concentration sensor	Magnetic sensor	Analog signal
⑨	TFD	Toner Container Full Detector	Full waste toner container sensor	Transmissive type photosensor	High when waste toner is full.
⑩	CD	Cassette Detector	Cassette sensor	Pushswitch	On when a cassette is in.
⑪	CSW	Cabinet Switch	Front door position sensor	Interlock switch	On when closed.
⑫	MSW	Main Switch	Power switch	Seesaw switch	On when closed.
⑬	Thermistor (Rth)	Thermistor	Fuser block temperature detection	Thermistor	High resistance when temperature is low (high VRth).
⑭	Thermostat (TS)	Thermostat	Fuser block high temperature detection	Thermostat	Contact breaks when a high temperature is sensed.
⑮	CPFS	Cassette Paper Feed Solenoid	Paper takeup control solenoid	Solenoid	Takeup roller starts operating when on.
⑯	RRS	Resist Roller Solenoid	Resist roller control solenoid	Solenoid	Resist roller starts operating when on.

5. Magnetic clutches and motors



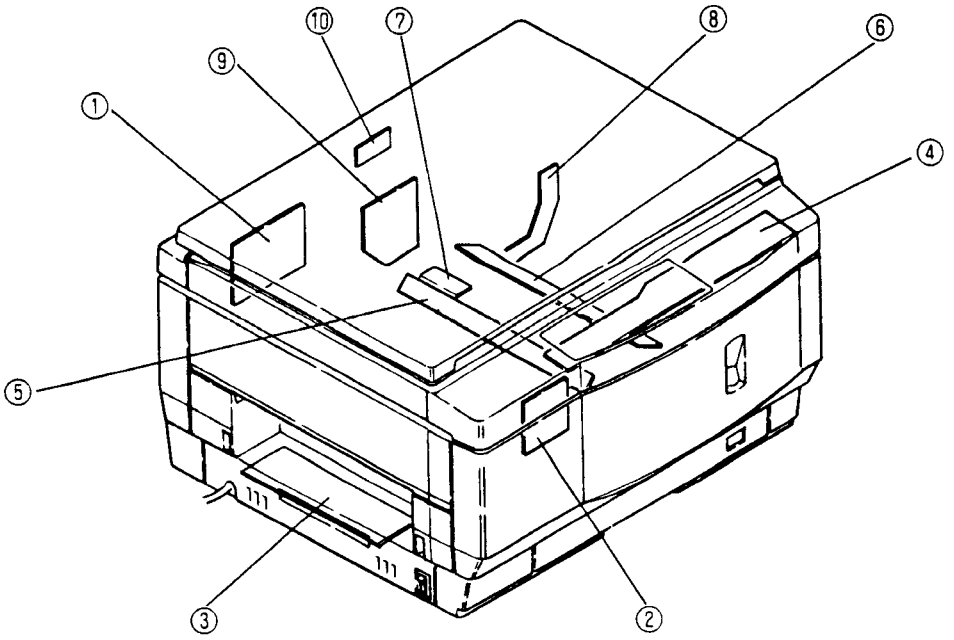
(SF-7370)



(SF-7320)

No.	Name		Function	Type	Contact/output
①	MFC	Mirror Feed Clutch	Mirror base feed clutch	Magnetic clutch	On to drive the mirror base.
②	MRC	Mirror Return Clatch	Mirror base return clutch	Magnetic clutch	On to return the mirror base.
③	MM	Main Motor	Main motor	Induction AC motor	To drive mechanism.
④*	MM	Main Motor	Main motor	Brush DC motor	To drive mechanism
⑤*	MBM	Mirror Base Motor	Mirror base motor	Brush DC motor	To drive the mirror base.
⑥	CFM	Cooling Fan Motor	Cooling fan motor	Brush DC motor	
⑦	TM	Toner Motor	Toner supply motor	Synchronous motor	
⑧*	LM	Lens Motor	Lens drive motor	Stepping motor	

6. PWB



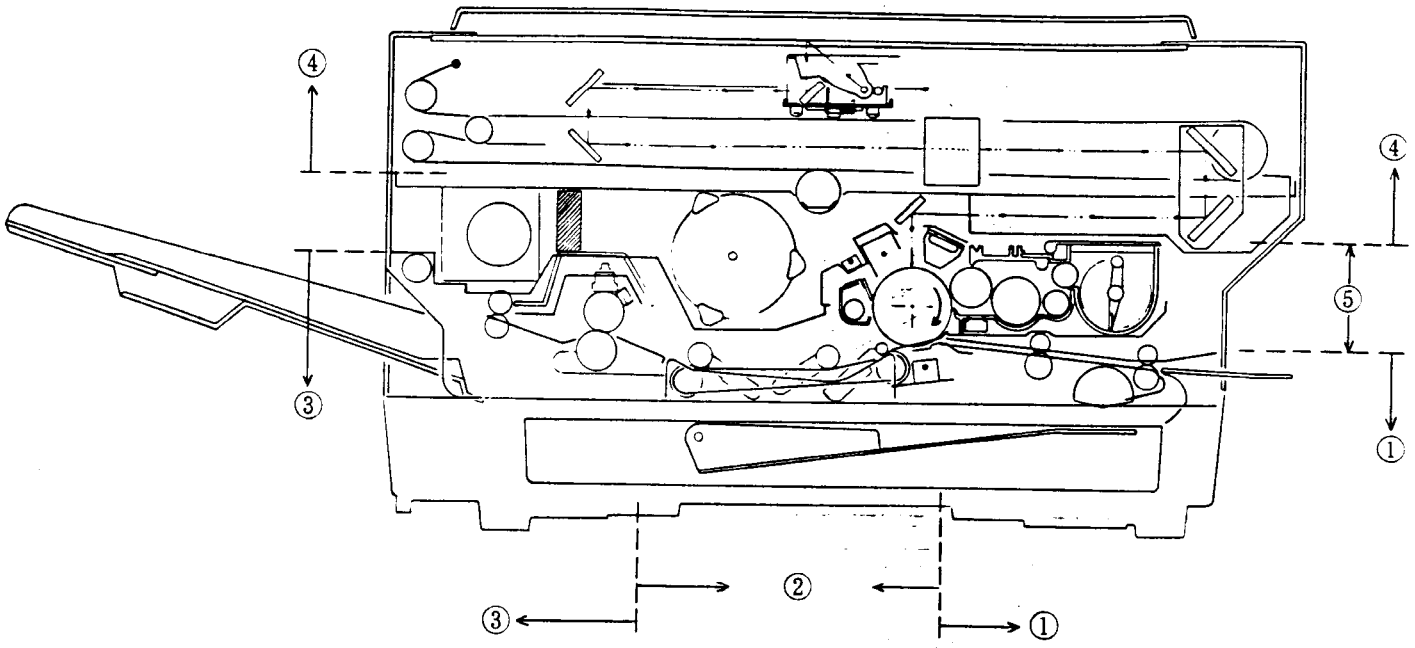
No.	Name	Parts code (SF-7320)	(SF-7370)	Description
①	Main PWB	CPWBF0885FC31	CPWBF0885FC32	Used to control circuits and loads.
②	CLC PWB	CPWBF0886FC51	←	Used to control copy lamp intensity (100V series)
		CPWBF0886FC52	←	(200V series)
③	DC power supply PWB	CPWBF0887FC31	CPWBF0890FC31	Used to rectify, convert voltage, and to smooth (100V series)
		CPWBF0887FC32	CPWBF0890FC32	Used to create DC power supply (120V series)
		CPWBF0887FC33	CPWBF0890FC33	CPWBF0890FC33 (200V EX series)
		CPWBF0887FC34	CPWBF0890FC34	FC34 (200V CISPL, VDE series)
④	Operation PWB	CPWBF0888FC51	CPWBF0888FC52	Consists of the display circuit and operation switch detect circuit.
⑤	DL PWB	CPWBF0889FC31	←	PWB that employed to optically remove the residual toner on the drum.
⑥	BL PWB	—	CPWBF0892FC51	PWB that employed to optically remove the change on the drum.
⑦	AE sensor PWB	CPWBF0561FC33	←	PWB that employed to sense the document contrast level.
⑧	Cassette detect PWB	CPWBF0647FC31	←	PWB used to detect a cassette and to relay paper feed block signal.
⑨	High voltage transformer unit	RTRNZ0436FCZZ	←	Used to supply high voltages and to control transformers.
⑩	Motor control PWB	—	CPWBF0891FC51	Used to control speed of the mirror base (100V series)
			CPWBF0891FC52	(200V series)

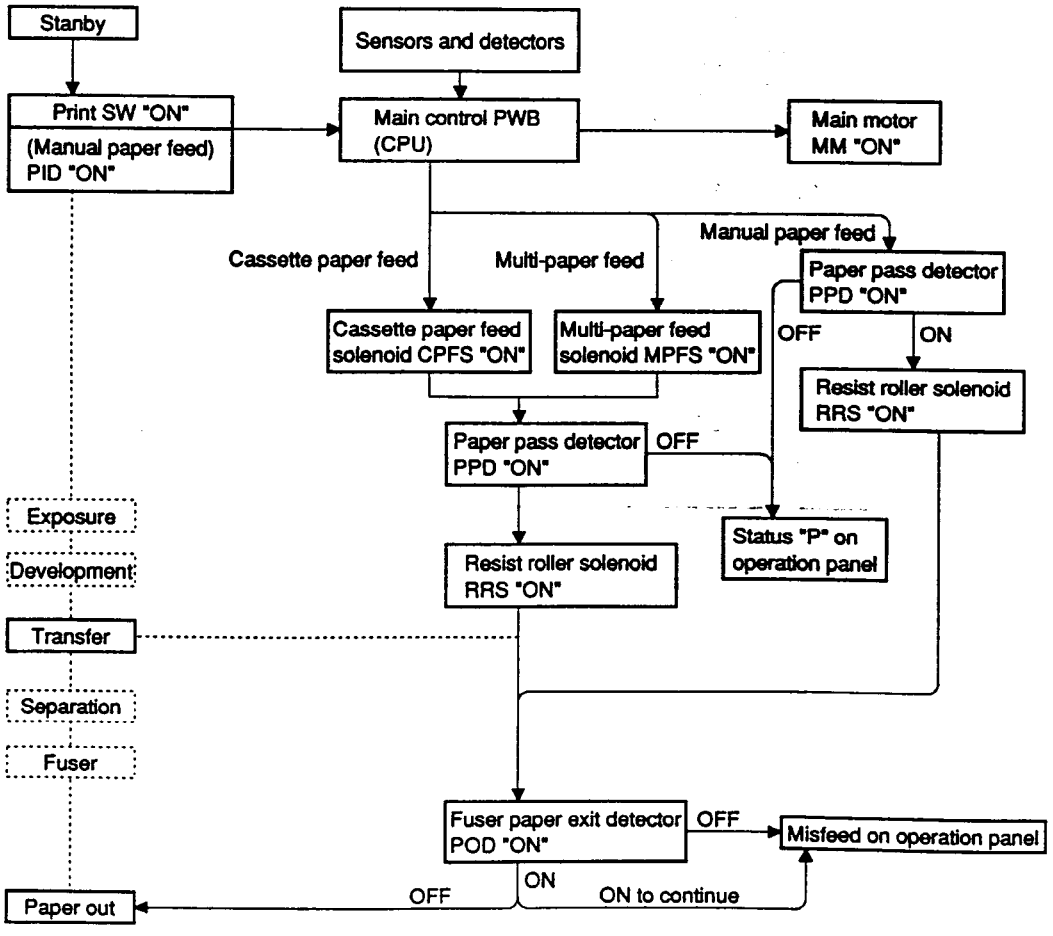
[5] DESCRIPTION OF EACH BLOCK

Description of each block is given below.

(1) Paper feed block
(2) Separation/transport block
(3) Fusing/paper delivery block
(4) Optical block
(5) Image process block

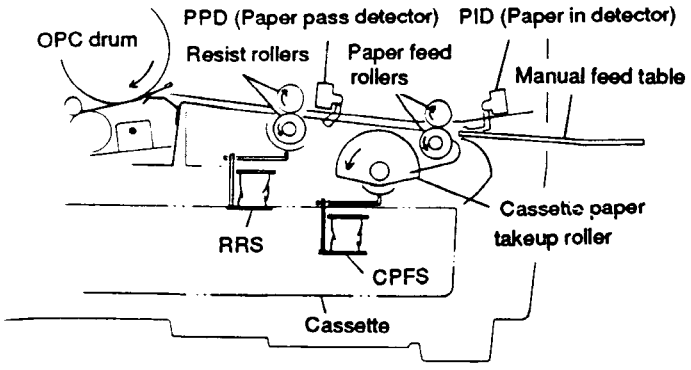
Machine overall view





1. Paper feed block

Two-ways are provided for feeding paper; cassette feed and manual feed.
A 250-sheets universal cassette is inserted in the machine through the lower part of the front cabinet.
Manual feed can be used to load a special paper or to make a copy on both sides of the paper.
It is also possible to use a multi-bypass stacker. (Optional)



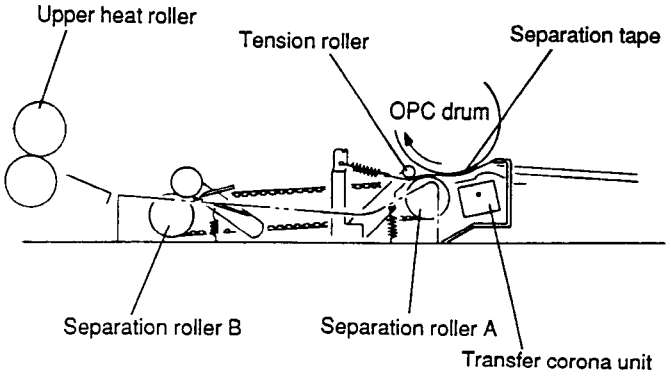
Cassette paper size range:
Paper size: B4 to A5 (10" x 14" to 8½" x 5½")
Paper weight: 56g to 80g/sq. meter

Manually bypass paper size range:
Paper size: B4 to A6 (10" x 14" to 8½" x 5½")
Paper weight: 52g to 128g/sq. meter, but, the paper exceeding 105g/sq. meter must be smaller than A4 (8½" x 11½").

Kinds of special papers (manual feed only):
Second side: 52 to 70g/sq. meter
Overhead projector film: 70 to 128Kg/sq. meter
Label and card: 70 to 128g/sq. meter

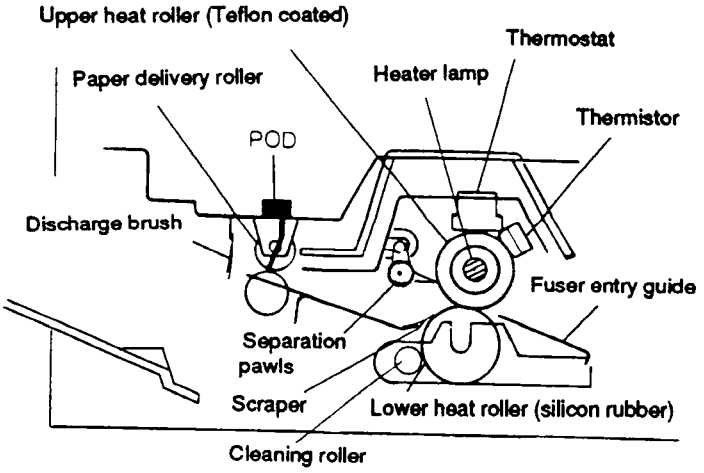
2. Separation/transport block

Paper fed into the machine is transported to the transfer block. An area of about 7mm on the rear frame side passes under the remover tape and does not make contact with the drum, which causes a void area on the copy.
After the image is transferred, the portion under the remover tape is held between the separation roller A and the tension roller and the paper is separated from the drum. The paper is then transported to the fusing block by means of the separation roller B.

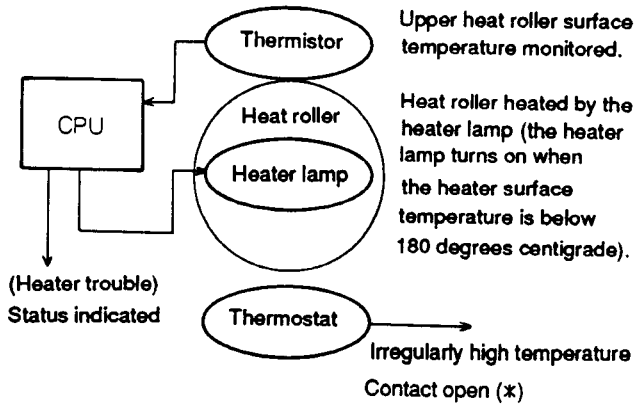


3. Fusing/paper delivery block

The toned image, transferred to the paper, is fused using heat and pressure. Static on the paper is removed by means of the discharge brush when the copy is delivered into the receiving tray.



Temperature control

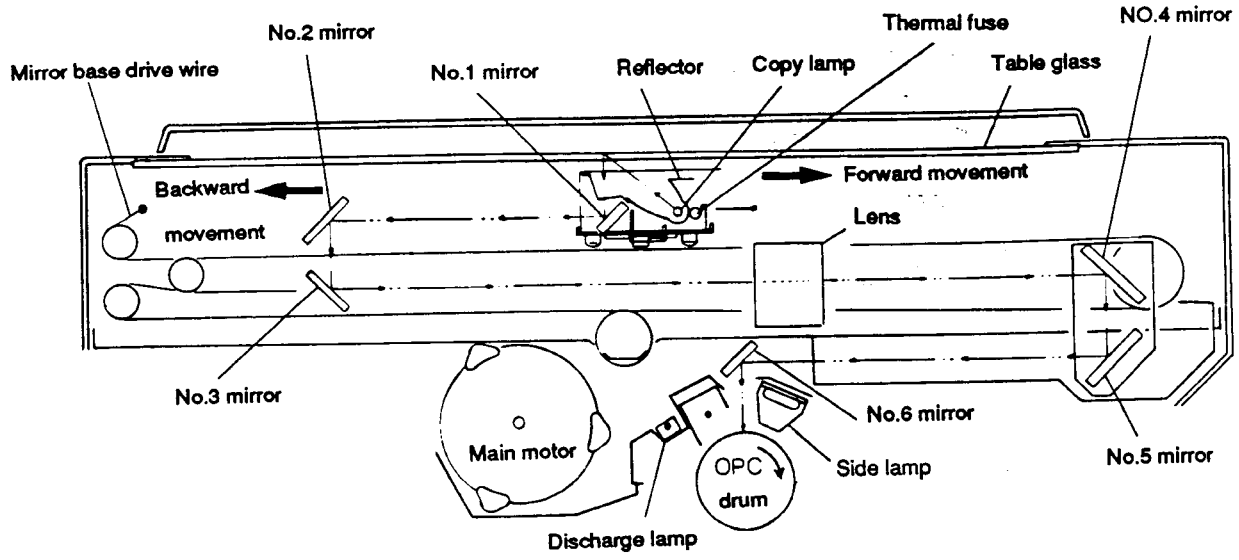

Thermistor
Upper heat roller surface temperature monitored.
CPU
Heat roller
Heater lamp
Heat roller heated by the heater lamp (the heater lamp turns on when the heater surface temperature is below 180 degrees centigrade).
(Heater trouble) Status indicated
Thermostat
Irregularly high temperature
Contact open (*)

- Irregularly high temperature (H3)
- Irregularly low temperature (H4)
- Open thermistor (H2)

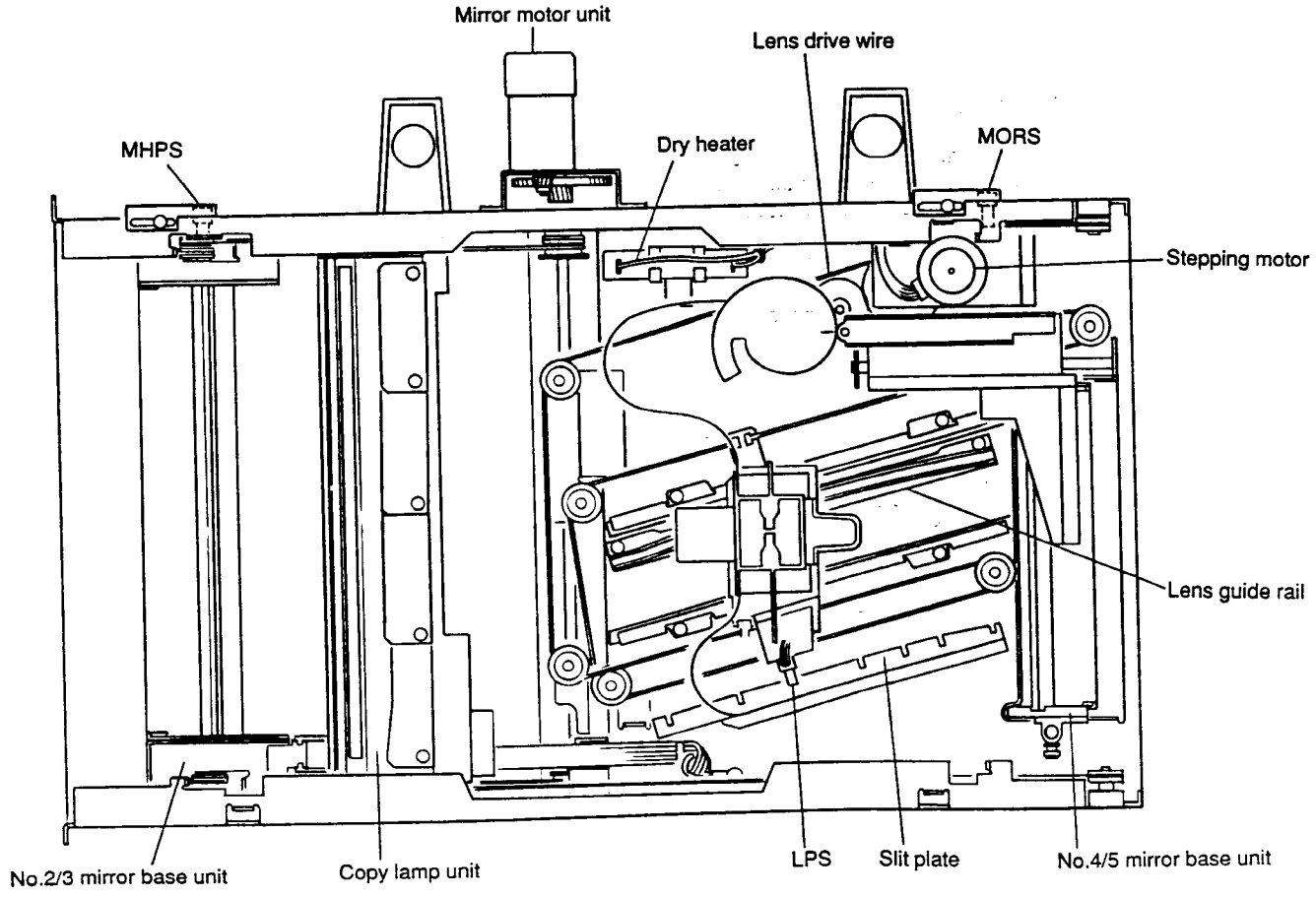
(*) When the thermostat is open, the reset button on the top of the thermostat must be pushed down to reset, as it is not self resetting.

4. Optical block

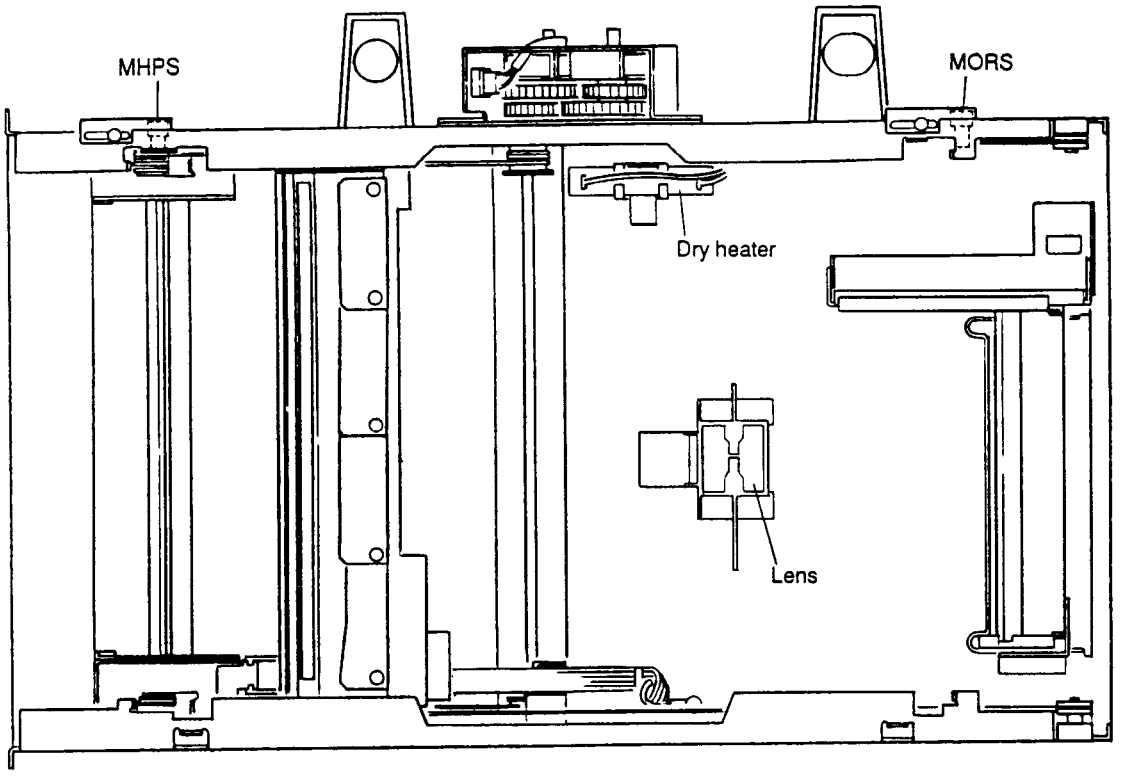
- The optical block consists of a fixed focus lens and six mirrors. Because a fixed focus lens is used, the No.4 and 5 mirrors are moved according to the magnification ratio, to change the distance between the document and the drum (OID: Original Image Distance).
  A stepping motor is employed to move the lens and mirror locations to variable steps of magnification in increments of 1% each with signal from the main control PWB. The SF-7320 does not incorporate the magnification feature.
- Exposure is controlled by varying the copy lamp voltage. The AE sensor is in the copy lamp unit to sense document contrast. Light reflected from the document is received by the AE sensor to determine exposure.
- Slit exposure control method is used for the moving light source (stationary platen).



(SF-7370 top view)



(SF-7320 top view)



(1) Name and function of each components

① Document table

The document table is stationary and the original is aligned to the front corner of the document guide.

② Copy lamp

100V series: 80V, 250W
200V series: 160v, 250w
Voltage to the copy lamp is controlled by the CLC circuit to produce stable exposure according to the document contrast.

③ Lens

Fixed focus lens

④ Lens position sensor (LPS)(SF-7370 only)

Output signal from this sensor is used for the basic signal to determine the copy magnification ratio.

⑤ Lens carriage (SF-7370 only)

The lens and LPS are mounted on this base which is driven by the lens/mirror drive motor to move towards the paper entry side when in the reduction mode or towards the paper exit side when in the enlargement mode.

⑥ Lens guide rail (SF-7370 only)

The lens carriage travels over the lens guide rail to control the lens optical axis in the magnification mode.

⑦ Lens drive wire (SF-7370 only)

Connected to the lens/mirror drive wire to control the No.4/5 mirror.

⑧ No.4/5 mirror base unit

The No.4 and 5 mirrors are mounted on this unit and shift position by means of the lens drive motor to match the original image distance. (SF-7370 only)

⑨ No.4/5 mirror base drive cam (SF-7370 only)

Used to shift the position of the No.4/5 mirror base driven by the lens/mirror drive motor.

⑩ • Mirror home position sensor (MHPS)

A transmissive type photosensor is used to detect the position of the copy lamp unit home position.

• Mirror overrun sensor (MORS)

A transmissive type photosensor is used to detect the position of the copy lamp unit overrun position.

⑪ No.2/3 mirror base unit

This unit moves to scan the document image.

⑫ Copy lamp unit

Consists of the No.1 mirror, thermal fuse, AE sensor, copy lamp, exposure control plates, and reflector, and moves to scan the document image.

⑬ Thermal fuse

Attached to the reflector and functions to shut off the copy lamp drive power when an irregular optical system temperature is encountered.
100V: (119°C, 10A)
200V: (119°C, 10A)

⑭ Reflector

Used to reflect the copy lamp light on the document.

⑮ Exposure control plates

Four plates are attached to the copy lamp unit to adjust exposure balance between front and rear frame sides.

⑯ Mirror base drive wire

Used to drive the copy lamp unit and No.2/3 mirror base

⑰ Stepping motor (SF-7370 only)

Used to drive the No.4/5 mirror base.

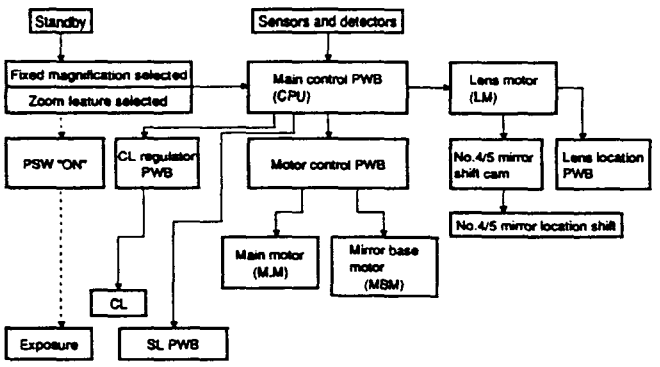
⑱ AE sensor

The photodiode is used to detect contrast of the document by the intensity of the light reflected from the original surface. The sensor working area is (100)mm wide from the front.

⑲ Blank lamp (side lamp)

Side void areas of the SF-7370 in the reduction mode are created using ten LEDs (LD1~LD10). In the reduction mode, light from the side lamp is projected over the non-image area of the drum to discharge the area so that toner is not applied to the non-image area. The side void areas are provided by masking the MC grid.

(2) Magnification operation

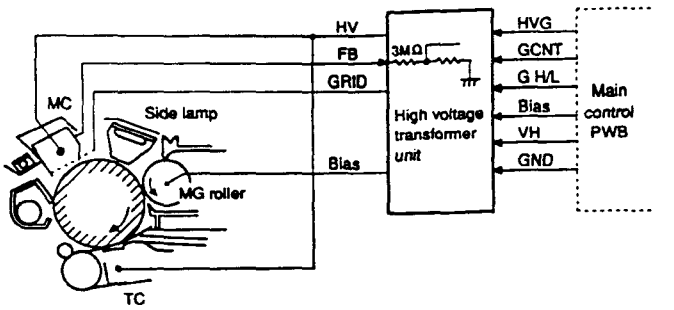


When the magnification ratio is chosen, the CPU of the man control PWB sends a pulse signal to the lens motor (stepping motor) according to the magnification ratio.
The lens motor rotates to shift the position of the lens and the position of the mirrors (No.4, No.5) shift via the No.4/5 mirror shift cam.
When the slit assigned to the given magnification ratio is sensed by the lens position sensor (LPS), the lens motor stops. The CPU (main control PWB) sends the clock signal (SLCLK) to the SL PWB corresponding to the reduction ratio to control ten LEDs.

5. High voltage transformer

Charge and transfer high voltage outputs are obtained from a single high voltage unit for the SF-7370 and SF-7320.
The Scorotron grid voltage control system is adopted for the main corona unit (MC) to supply regulated current to obtain secure copy quality.

[Block diagram]

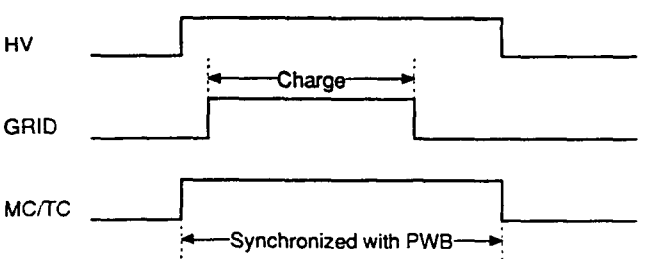


High voltage outputs	Technical characteristics	Transfer corona Drum surface current	
		Nominal	Tolerance
HV (MC/TC high voltage output)	5 ~ 6KV, 1mA, max.	18.0±3μA	2μA
FB (MC housing current feedback input)	−315μA, regulated.		
GRID (MC grid electrode power supply)	−50V/−590V/ −750V		
BIAS (developing bias power supply)	−200V		

High voltage unit inputs

HVG (high voltage "ON" signal)	Output on when GND level.
GCNT (MC grid signal)	Output on when GND level.
G H/L (MC grid level select signal)	Non-charge/photo mode/normal mode
BIAS (developing bias signal)	Output on when GND level.

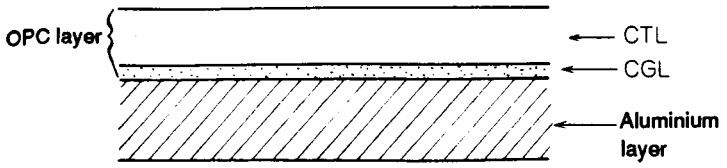
The high voltage output HV is supplied to both MC and TC. The main corona housing current is fed back to the high voltage transformer unit FB to control the current. A 3MΩ resistance is provided in the high voltage unit to correct the MC and TC impedance.
The photoconductor is switched to charge and discharge by controlling the main corona grid voltage.



The lead edge void area is made adjustable by changing the "ON" timing of GRID using test command 58.

6. Image process block

- The SF-7320/SF-7370 use an Organic Photo Conductor (OPC) drum.



CTL (Charge Transport Layer) of 21 microns

CGL (Charge Generator Layer) of 0.2 to 0.3 microns

(1) The basic copy process

Operational theory

A charge is applied over the OPC drum surface from the main corona unit. The image exposed by the copy lamp is projected over the drum. The charge on the drum surface is dissipated in all area except, for the character areas of the original, to form a latent image on the drum surface. Toner is attracted to the charge on the drum surface and a visible image is now formed on the drum.

Step 1. Charge (Transfer corona unit)

A uniform negative charge is applied over the OPC drum surface by transfer corona unit.

Step 2. Optical discharge

Residual charge on the drum surface is removed by the discharge lamp.

After Step 1 (charge), Step 2 (cleaning) and Step 3 (discharge), the drum surface potential becomes stable and is ready for operation.

Step 3. Charge (Main corona unit)

A uniform negative charge is applied over the drum surface by the main corona unit.

Step 4. Exposure

An electrostatic latent image is formed over the drum surface.

Step 5. Developing

The electrostatic latent image is converted into a visible image by the toner.

Step 6. Transfer (Transfer corona unit)

The visible image on the drum surface is transferred onto the copy paper.

Step 7. Cleaning

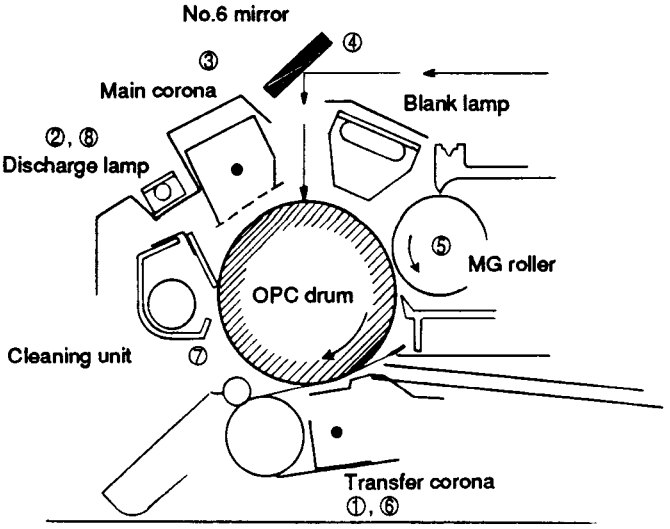
Toner remaining on the drum is collected by the cleaner blade.

Step 8. Optical discharge

Residual charge on the drum surface is removed by the discharge lamp.

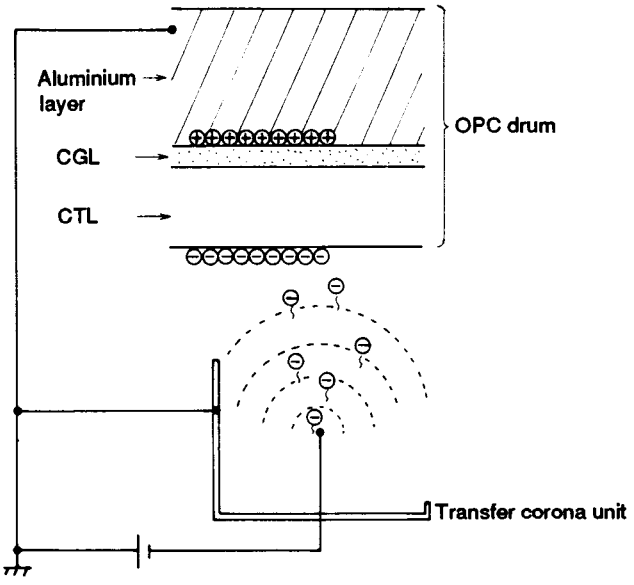
(2) Copy steps

○ : Step number



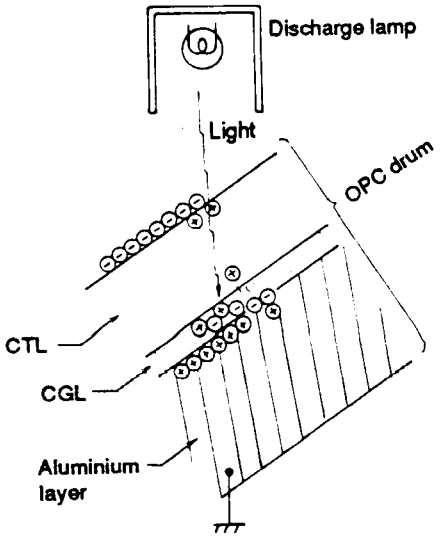
Step 1: Charge (Transfer corona unit)

Prior to going into the copy cycle, a uniform negative charge is applied over the drum surface by the negative transfer corona unit. A positive charge appears in the aluminium layer.



Step 2: Discharge

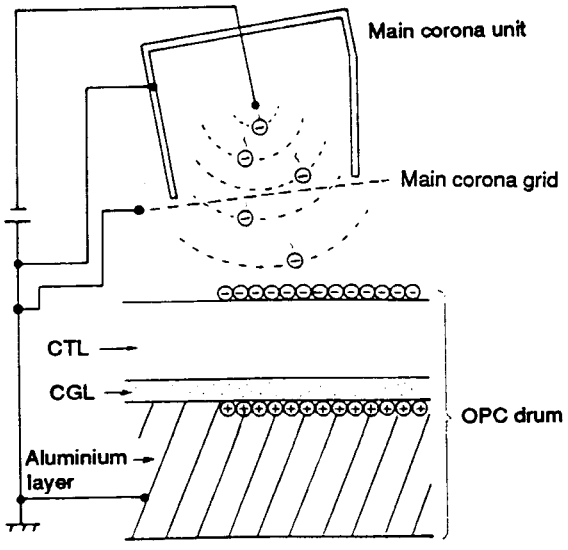
Light from the discharge lamp is projected onto the drum surface. Positive and negative charges appear in the CGL of the drum. The negative charge in the CGL moves toward the positive charge in the aluminium layer. Meanwhile, the positive charge moves toward the negative charge on the drum surface created at Step 1. The drum's surface charge is reduced to a very low potential (almost 0 volts) because of the neutralization effect that occurs between the positive and negative charges on both the drums surface and aluminum core.



After Step 1 (charge), Step 2 (cleaning) and Step 3 (discharge), the drum surface potential becomes stable and is ready for operation.

Step 3: Charge (Main corona unit)

A negative charge is applied over the drum surface by the main corona unit. A positive charge develops in the aluminium layer.



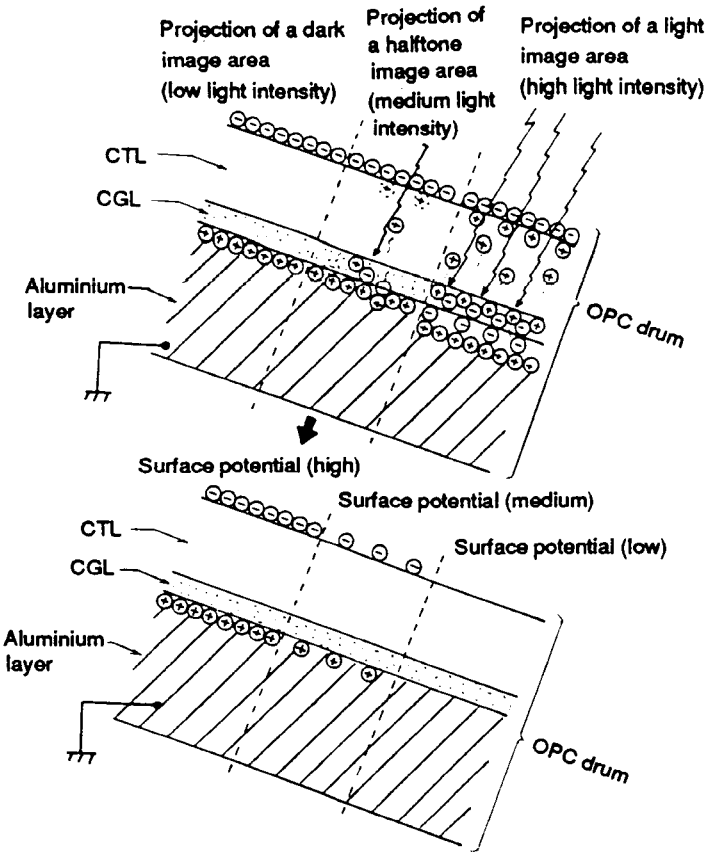
Step 4: Exposure

Light from the copy lamp is projected on the original and reflected onto the drum surface through the mirrors and lens.

Since more light is reflected from light image areas of the original, the respective drum area is exposed to more intense light. On the other hand, less light is reflected from dark image areas of the original so that the respective drum area is exposed to less intense light.

Negative and positive charges appear in the CGL. The negative charge caused in the CGL advances to the positive charge in the aluminium layer produced at Step 4, and the positive charge advances to the negative charge on the drum surface. Therefore, the positive and negative charge in the aluminium layer and the drum surface where exposed to light neutralize each other and the drum surface potential drops. Since the charge in the CGL is proportionate to the density of the original, more charge is created in the CGL areas exposed to more intense light. The decrease in the drum surface potential is greater as more of the drum surface negative charge is dissipated. On the other hand, the dark image portion (less intensive light projected area on the drum surface) has less CGL charge creation, so that a less drum surface potential decrease occurs. In this way, the electrostatic latent image is formed on the drum surface.

The dark image portion of the original reflects a less intense light back to the drum. This causes a lower charge in the corresponding areas of the CGL, which in turn causes little or no dissipation of drum surface potential.


Projection of a dark image area (low light intensity)
Projection of a halftone image area (medium light intensity)
Projection of a light image area (high light intensity)
CTL
CGL
Aluminium layer
OPC drum
Surface potential (high)
Surface potential (medium)
Surface potential (low)

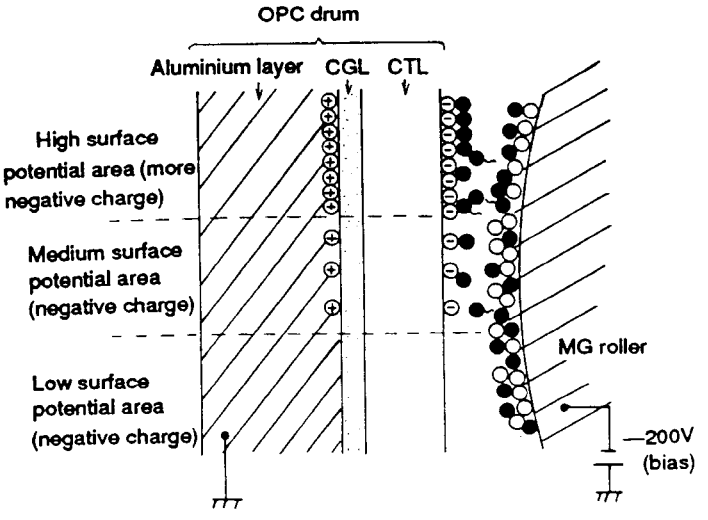
Toner is then applied to the latent image on the drum surface in the development stage of the process. Toner will be attracted by only the higher charged or character areas of the drum surface forming a visible image.

Step 5: Developing

Toner is attracted over the latent image area on the drum surface to form a visible image. Toner is positively charged by friction with the carrier. The SF-7320/SF-7370 employs two component magnetic brush developing system and toner is attracted by the negative charge on the drum surface.

Since the drum surface potential is higher in the dark image area (exposed to less intense light), more toner is therefore attracted and vice versa.

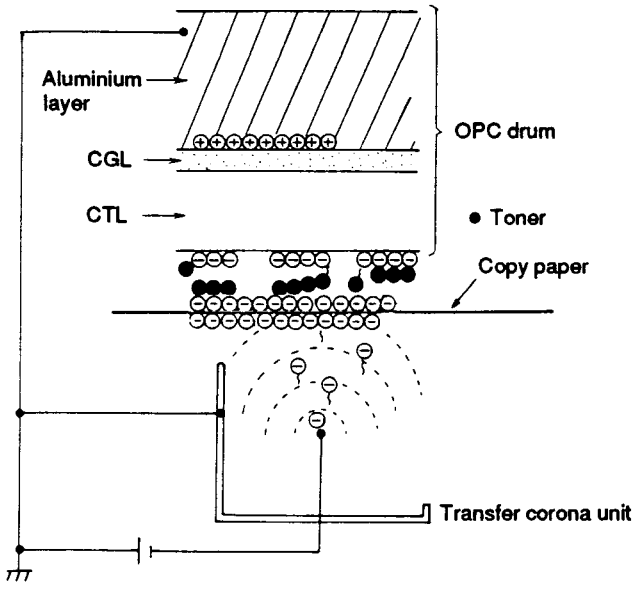
○ : Carrier (magnetic particle)
● : Toner (charged positive by friction)



Step 6: Transfer (Transfer corona unit)

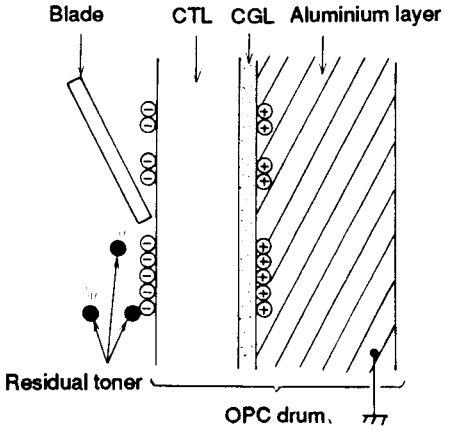
The copy paper is charged to a higher potential than the drum surface by means of a negative transfer corona unit, a stronger attraction exists appears between the copy paper and the toner than between the drum and the toner. So the toner is drawn from the drum to paper.

Toner transfer efficiency is between 70 to 80%, 20 to 30% remains on the drum.



Step 7: Cleaning

The toner remaining on the drum surface is removed by means of the cleaning blade. The waste toner is then deposited in the waste toner container using the waste toner carrying shaft.

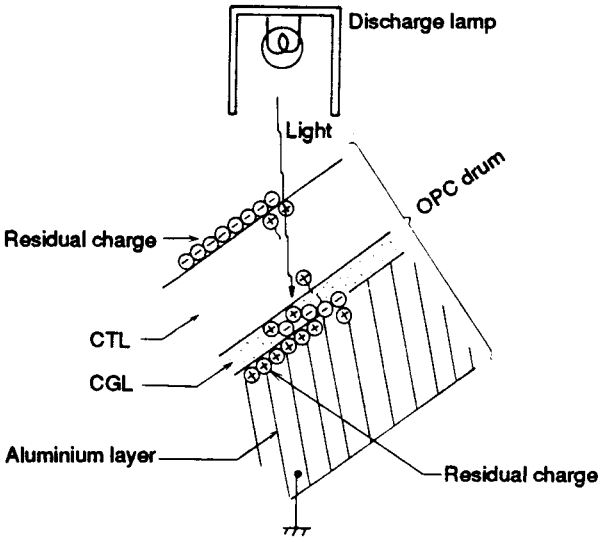


Step 8: Discharge

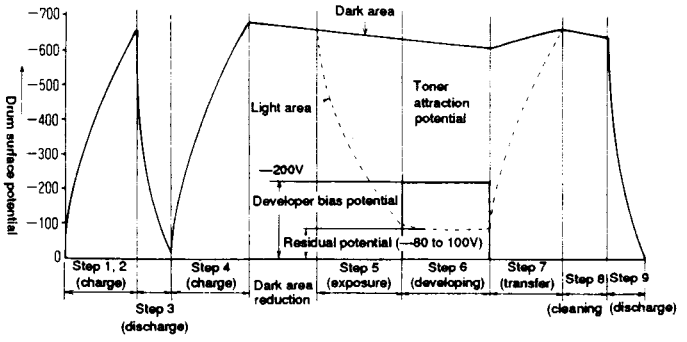
By exposing the drum surface to the discharge lamp, positive and negative charges appear in the CGL. The negative charge produced in the CGL advances toward the residual positive charge in the aluminium layer, while the positive charge advances in the aluminum toward the residual negative charge on the drum surface.

In this way, the positive charge and the negative charge neutralize each other on the drum surface and in the aluminium layer.

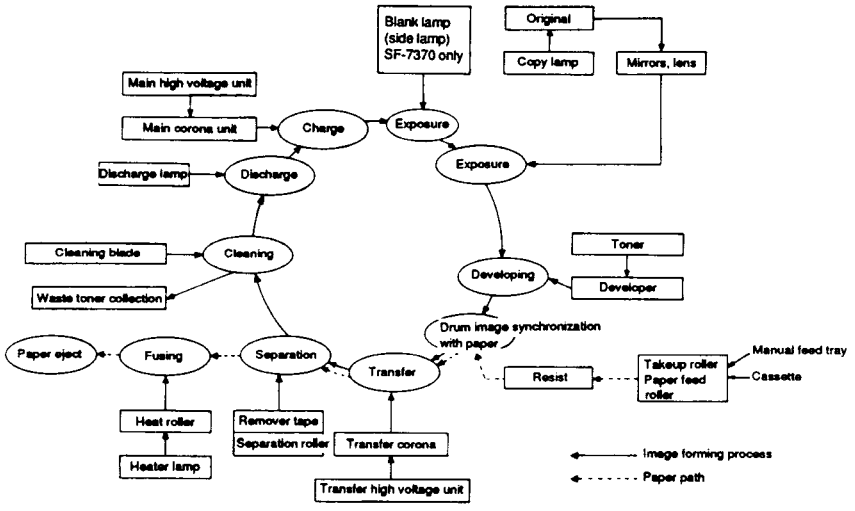
This causes the drum surface potential to approach 0 volts.



(3) Transition of drum surface potential



(4) Functional diagram

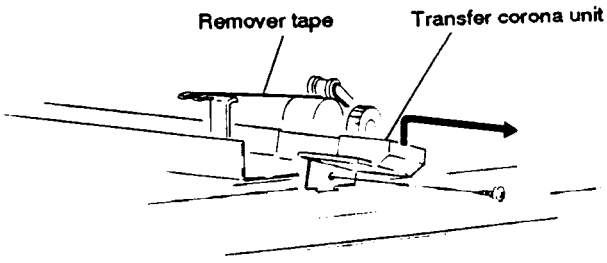


[6] DISASSEMBLY

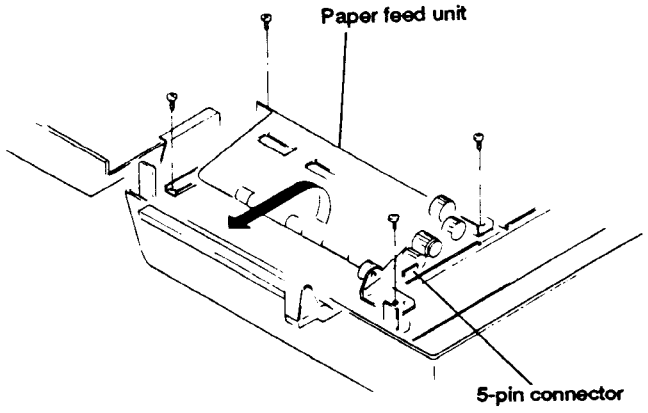
1. Paper feed block

(1) Removing the paper feed unit

① Open the clam shell mechanism. Remove the transfer corona unit from the rear frame side with care not to damage the remover tape.



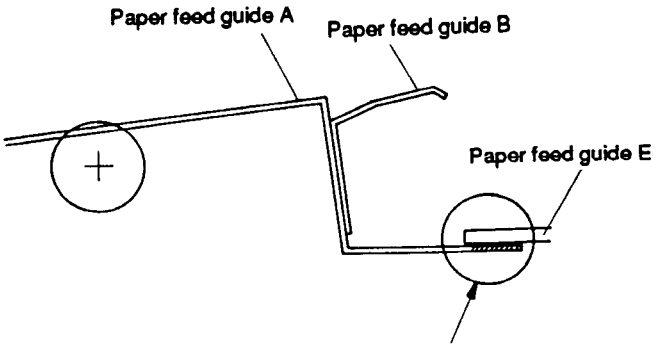
② Remove the 5-pin connector.
Remove the paper feed unit holding screws (four).
Remove the paper feed unit in the arrow direction.



Reverse the procedure to re-install.

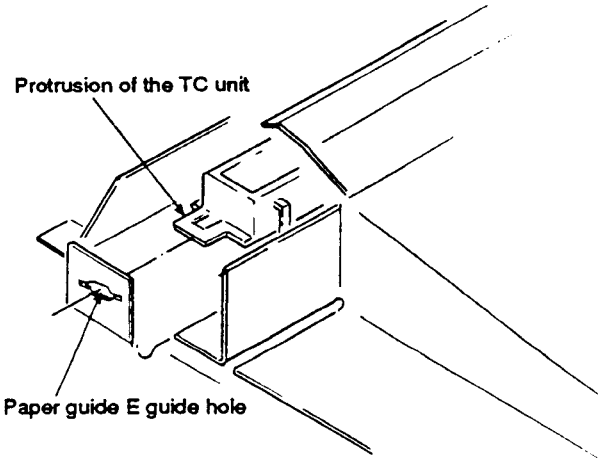
(Hints in installing the paper feed unit)

Insert the transfer side (hatched portion) of the paper guide (A) under the paper guide E.



(Hints in installing the transfer corona unit)

Insert the protrusion of the transfer corona unit into the guide hole in the front frame side paper guide E.



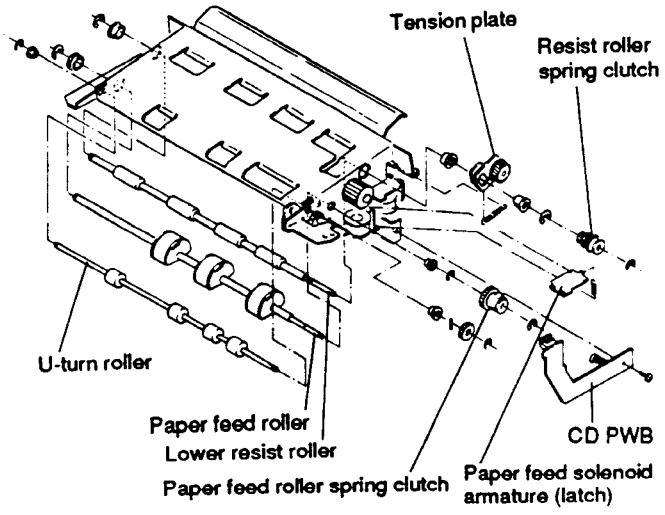
(2) Removing the paper feed roller, u-turn roller, resist roller

① Remove the paper feed unit.

②-a. (Paper feed roller)
Remove the paper feed roller spring clutch, paper feed solenoid armature, and the CD PWB.
Remove the paper feed roller. Three E-rings, two bushings, and one screw.

-b. U-turn roller)
Remove the CD PWB, gear, and pin.
Remove the u-turn roller. Two E-rings, two bushings, and one screw must be removed.

-c. (Lower resist roller)
Remove the resist roller spring clutch, tension plate, and spring.
Remove the resist roller. Three E-rings and three bushings must be removed.

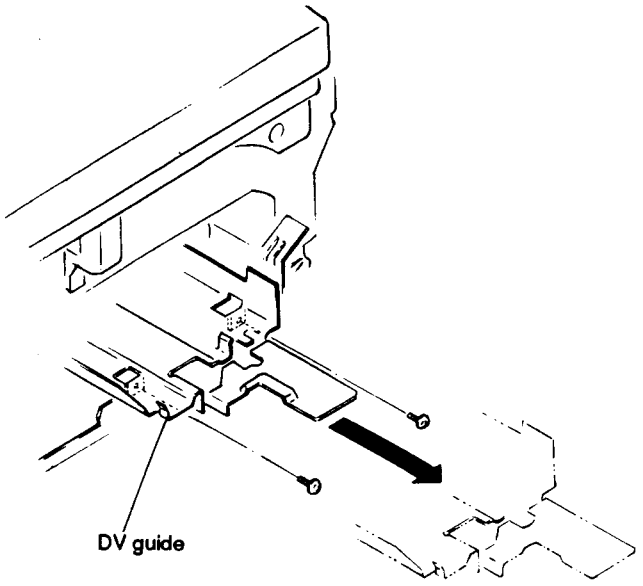


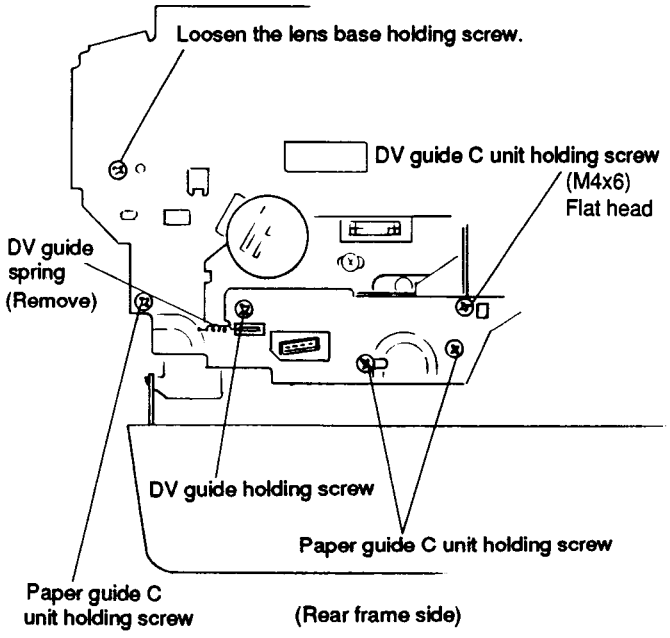
(3) Removing the paper guide C unit

① Remove the DV unit.

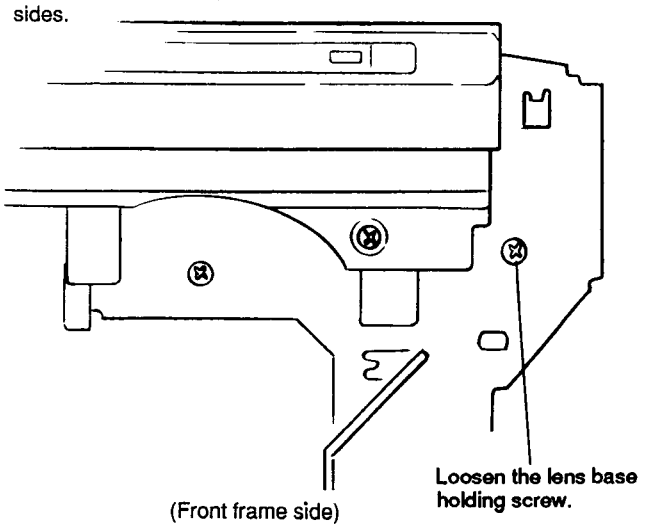
② Remove the drum unit.

③ Remove the DV guide (four screws).

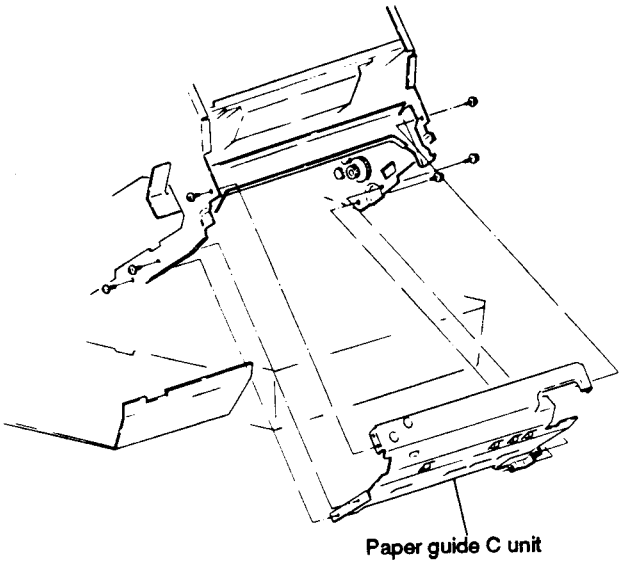




④ Loosen the lens baseplate holding screw, one each on both frame sides.



⑤ Remove the paper guide C unit (six screws).



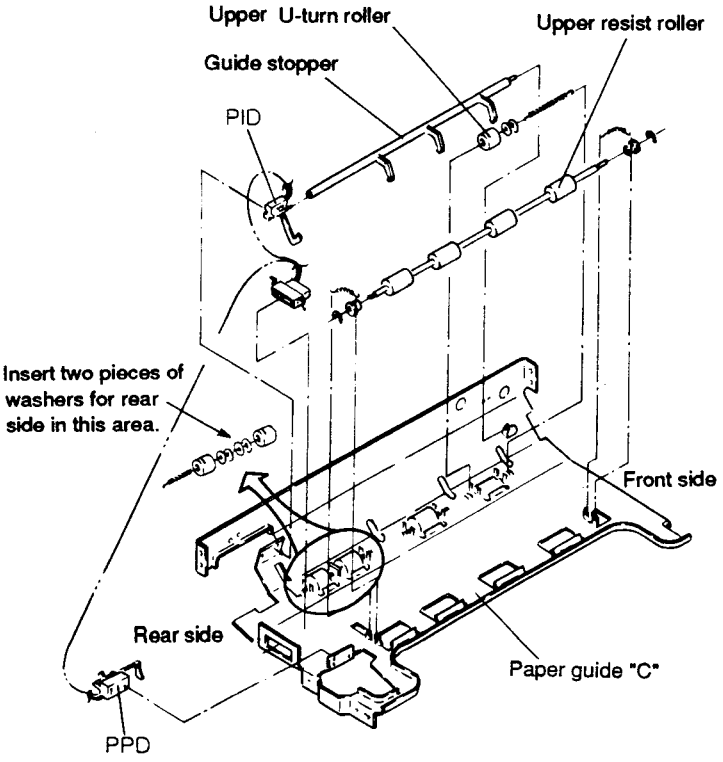
(4) Removing the PPID, upper resist roller, upper u-turn roller

① Removing the paper guide C unit.

② (PPID)
Release the hook of the PID and remove the PID. The guide stopper must be removed at the same time.
Release the hook of the PPD and remove the PPD.

(Upper u-turn roller)
Remove the spring and remove the upper u-turn roller.

(Upper resist roller)
Remove two springs, two E-rings, and two bushings.
Remove the upper resist roller.



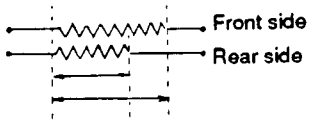
(5) Re-assembly hints and tips

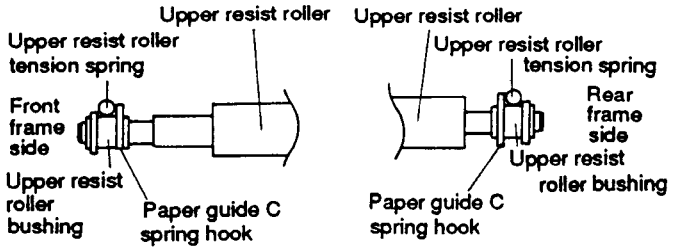
① When re-assembling the guide stopper, make sure that the stopper can move smoothly by its own weight.

② Because the upper guide C is treated with an electrically evaporated coating, be careful not to scratch the surface contacted by the paper.

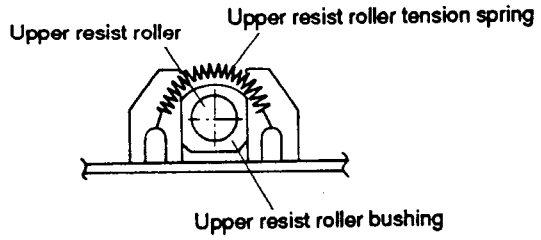
③ The upper resist roller must be installed in such a position that the upper resist roller tension spring is located between the paper guide C spring hook and the collar of the bushing, as illustrated below.

④ Note that shape of the resist roller tension spring differs between the front and rear frame sides; more tension is on the rear frame side tension spring.

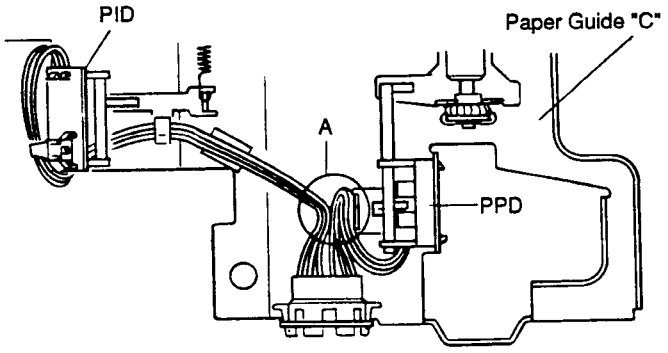


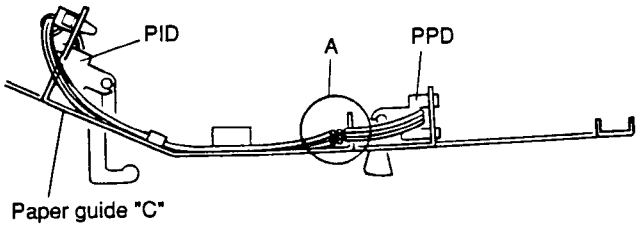

Upper resist roller
Upper resist roller tension spring
Front frame side
Upper resist roller bushing
Paper guide C spring hook
Upper resist roller
Upper resist roller tension spring
Rear frame side
Upper resist roller bushing
Paper guide C spring hook

The flat side of the upper resist roller bushing must face down.



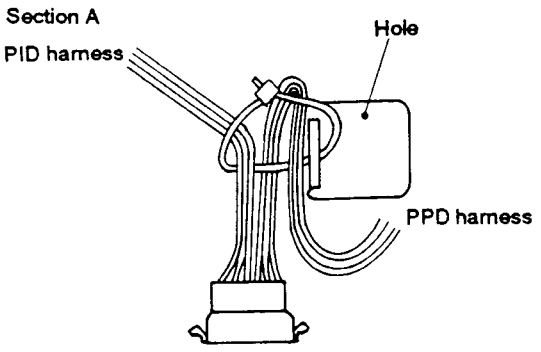
⑤ Wire routing
The harness must be routed in the following manner:



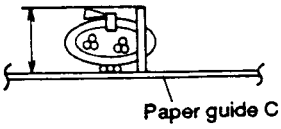


Treated with the electrically evaporated coating (Paper feed side.)

View of harness route



No part of the clamp should protrude out of this area.



2. Optical system

NOTE: Be sure to unfasten the power cord from the wall outlet before replacing the copy lamp thermal fuse.

Major parts replacement (mirror base related)

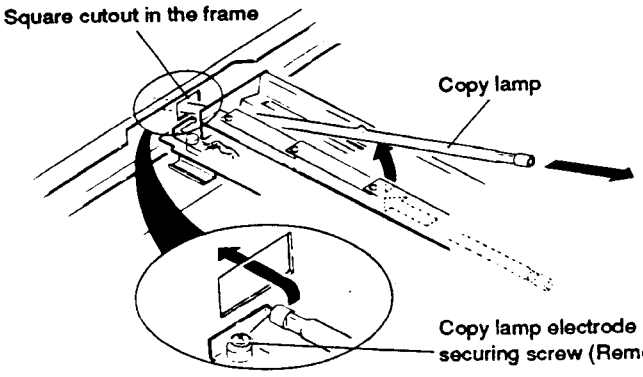
(1) Copy lamp

① Remove the glass holder.
Remove the table glass.

② Manually move the copy lamp unit to the square cutout in the frame.

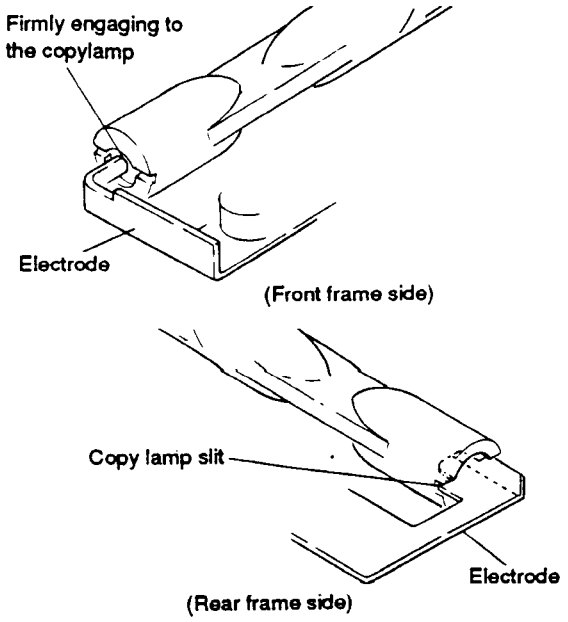
③ Remove screw that holds the copy lamp electrode on the front frame side.

④ Remove the copy lamp through the square cutout in the front frame (arrowhead).

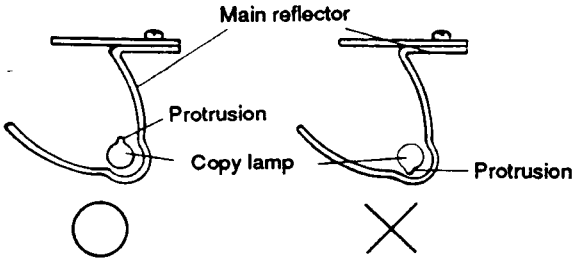


Installing the copy lamp

- Make sure that the electrode on the rear frame side is firmly engaged into the copy lamp slit.
Also, make sure that the electrode on the front frame side is firmly engaging to the copy lamp.



- The copy lamp protrusion must face up when installed.

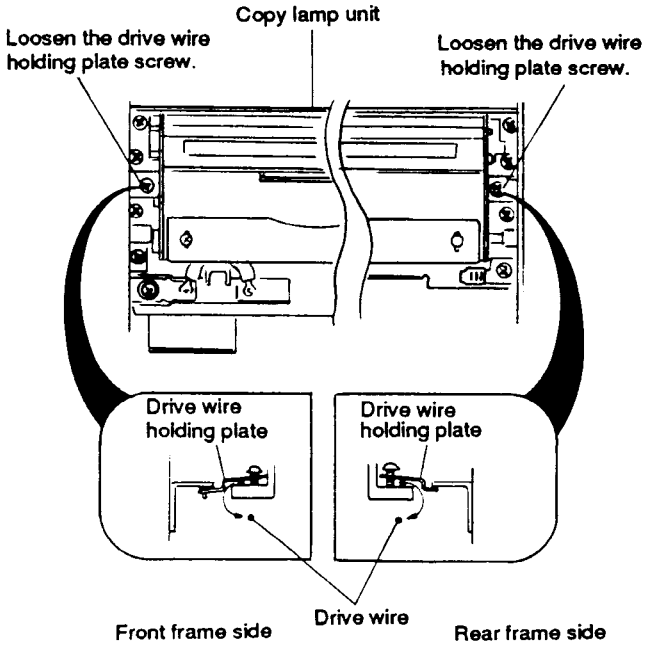


(2) Copy lamp unit

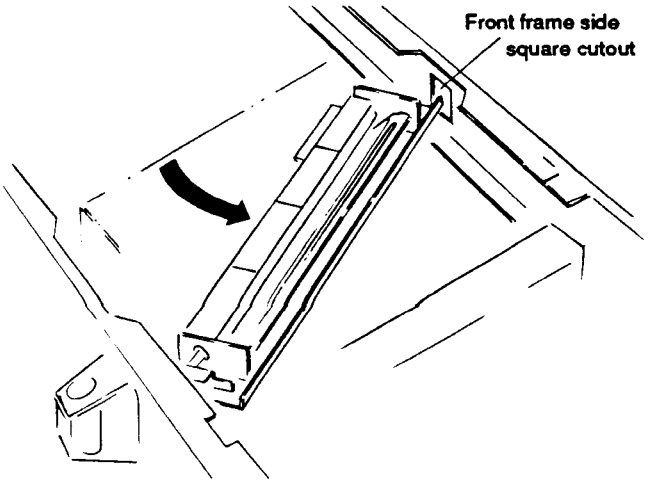
① Remove the table glass.

② Manually move the copy lamp unit to the cut in the frame.

③ Loosen the drive wire holding screws on the front and rear frame sides and remove the drive wire from the copy lamp unit.


Copy lamp unit
Loosen the drive wire holding plate screw.
Loosen the drive wire holding plate screw.
Drive wire holding plate
Drive wire holding plate
Drive wire
Front frame side
Rear frame side

④ Insert a corner of the copy lamp unit in the square hole in the front frame side and tilt it in the arrow direction to remove.



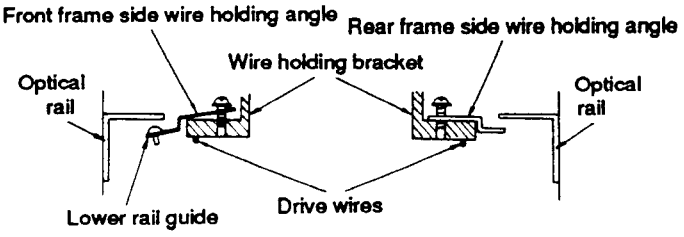
⑤ Unfasten the copy lamp harness from the mirror base, optical baseplate, and frame.

* The copy lamp unit comes supplied with the copy lamp harness.

Reverse the sequence to install the lamp unit, while observing the following precaution.

- The lower side rail guide fixed to the front frame side wire holding angle and the rear frame side wire holding angle must be placed under the optical rail when mounting the copy lamp unit on the optical rail.

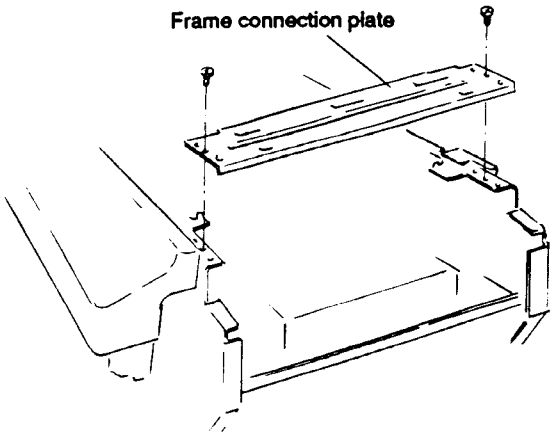
Drive wires must be placed under the wire holding brackets of the copy lamp unit.



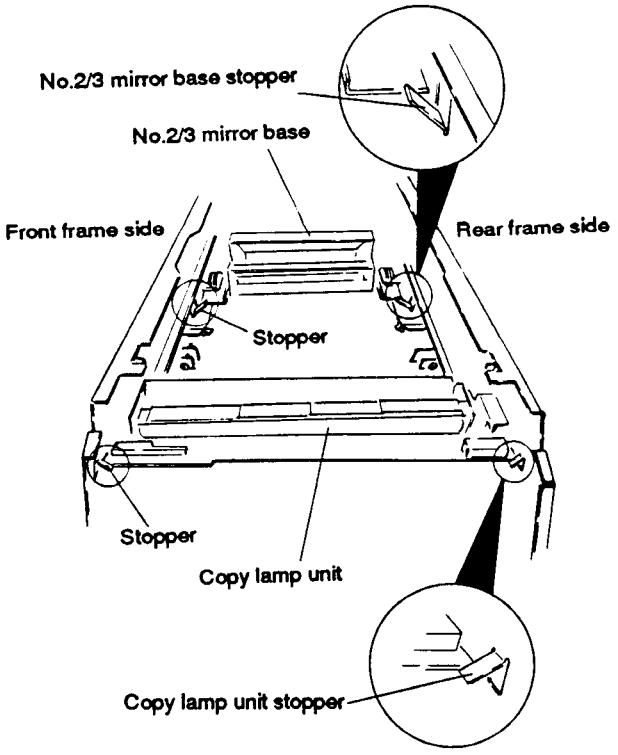
- Installing drive wires to the copy lamp unit

a. Place both front and rear frame side drive wires onto the slits of the wire holding bracket.

b. Remove the paper entry side frame connection plate.



c. Move the copy lamp unit and the 2/3 mirror base towards the paper entry side at the same time. Align the copy lamp unit and the 2/3 mirror base tact with the stoppers on both frame sides, then tighten the screws of the wire holding angles.



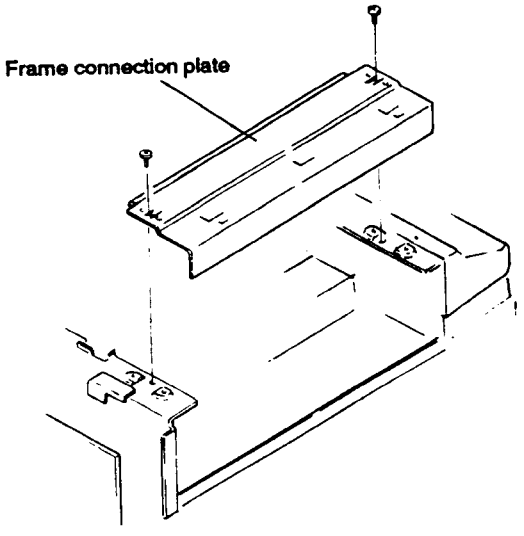
(3) Mirror base drive wire

(Removing the wire)

① Remove the panels (rear side, paper exit side and operational).

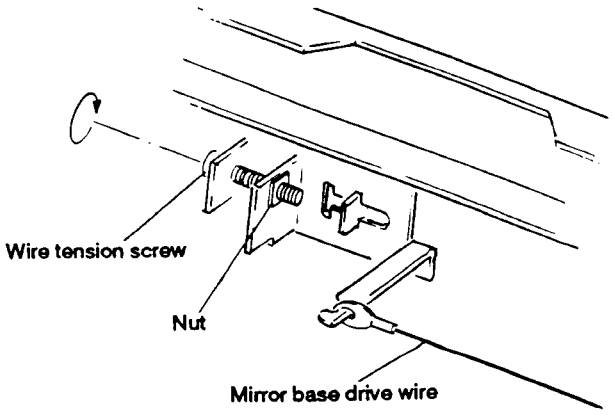
② Remove the table glass.

③ Remove the paper exit side frame connection plate.



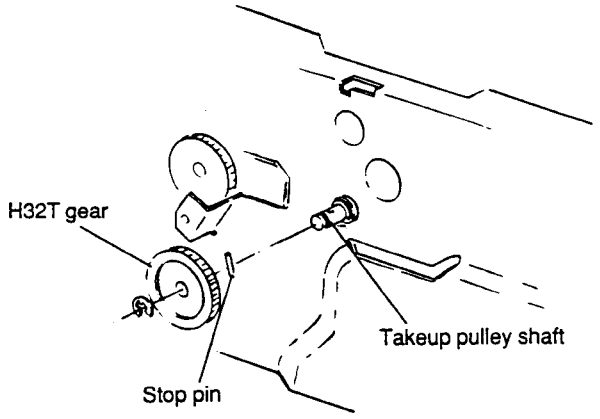
④ Remove the copy lamp unit and the copy lamp lead guide.

⑤ Loosen the nut of the mirror base wire tension spring on the side to be replaced. Rotate the tension screw counterclockwise to ease tension.



⑥ Remove the mirror motor unit (SF-7370), the clutch unit (SF-7320) the HV unit.

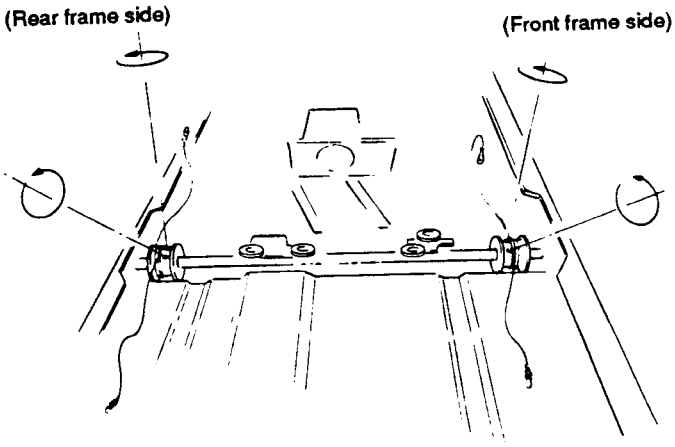
⑦ Remove the H23T gear stop pin from the rear frame side takeup pulley shaft. (CL28T gear: SF-7320)



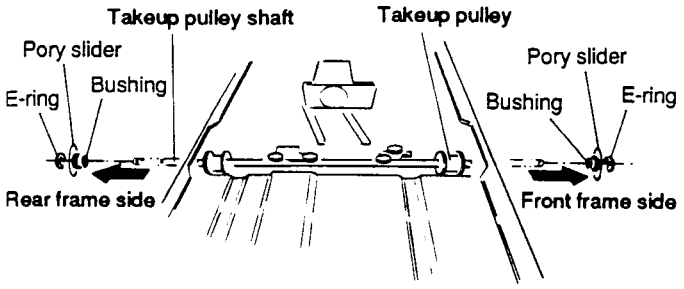
(Rear frame side)

⑧ Remove both ends of the wire which is to be replaced.

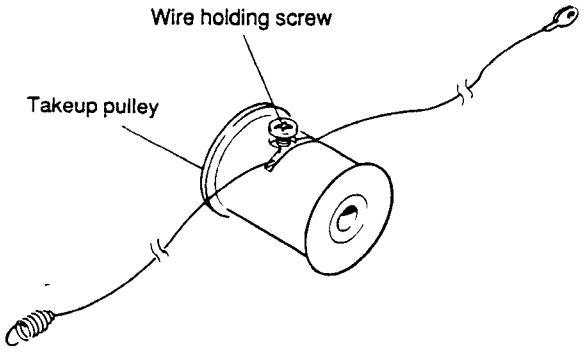
⑨ Loosen four setscrews on the takeup pulley.



⑩ Take out the takeup pulley shaft (two E-rings).

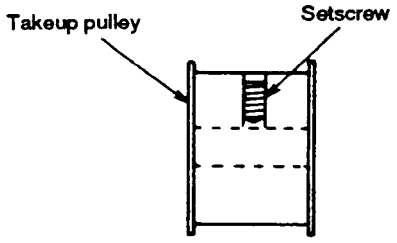


⑪ Loosen the wire holding screw and remove the wire from the takeup pulley.

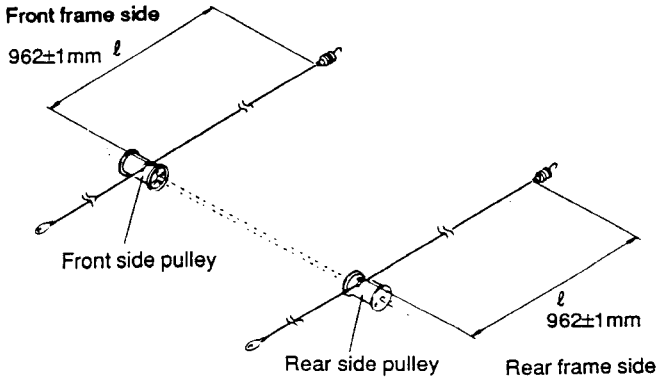


(Stretching wire)

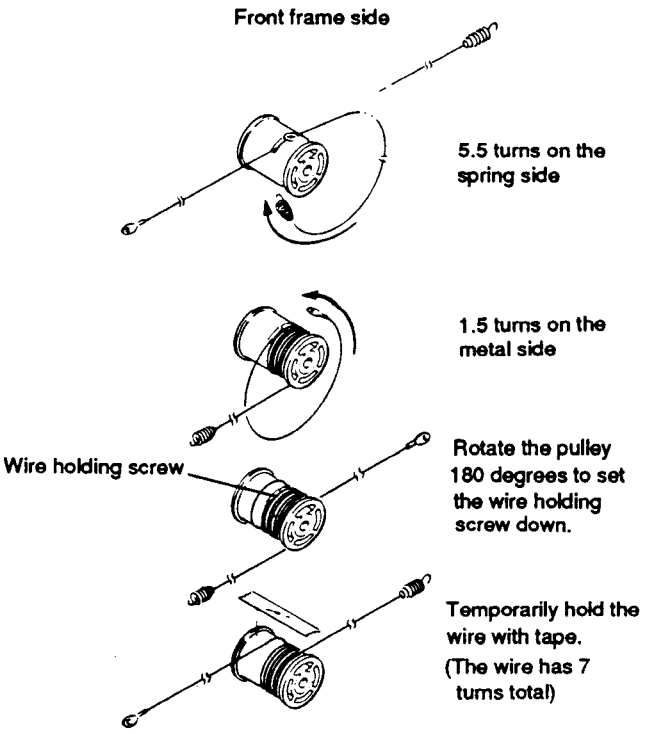
① Make sure that the setscrew of the takeup pulley is not extending from the inside and outside of the pulley.

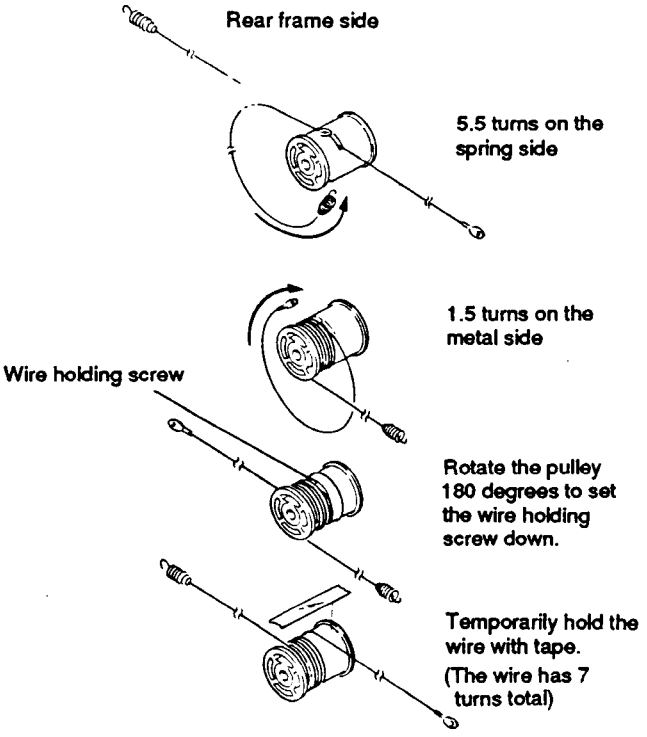


② Install the wire on the takeup pulley.
The length of the wire "ℓ" must be the same as the original wire and must be installed in the same direction.
Install the wire to the takeup pulley at the location 962±1mm from the end of the spring.



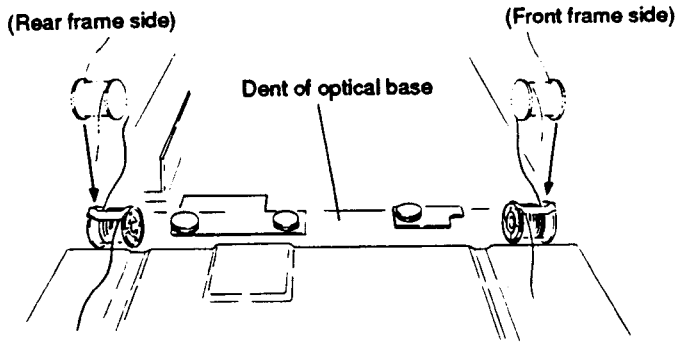
③ Make turns of the wire around the takeup pulley and secure it with a tape.


Front frame side
5.5 turns on the spring side
1.5 turns on the metal side
Wire holding screw
Rotate the pulley 180 degrees to set the wire holding screw down.
Temporarily hold the wire with tape.
(The wire has 7 turns total)


Rear frame side
5.5 turns on the spring side
1.5 turns on the metal side
Wire holding screw
Rotate the pulley 180 degrees to set the wire holding screw down.
Temporarily hold the wire with tape.
(The wire has 7 turns total)

④ Place the takeup pulley in the dent of the optical base as illustrated below and insert the takeup pulley shaft.

NOTE: The side of the shaft with the stop pin hole must be on the rear frame side.

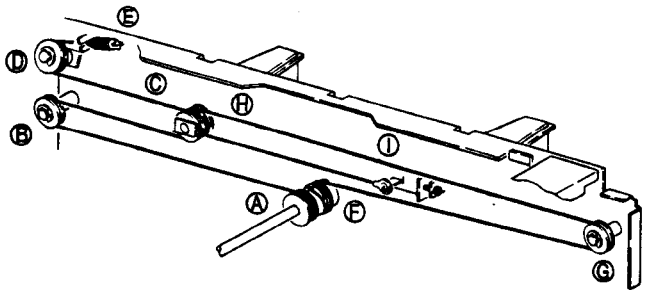


⑤ Install the E-ring, stop pin, and H32T (SF-7370)/CL28T (SF-7320) gear on the takeup pulley shaft.

⑥ Move the No.2/3 mirror base unit towards the paper exit side.

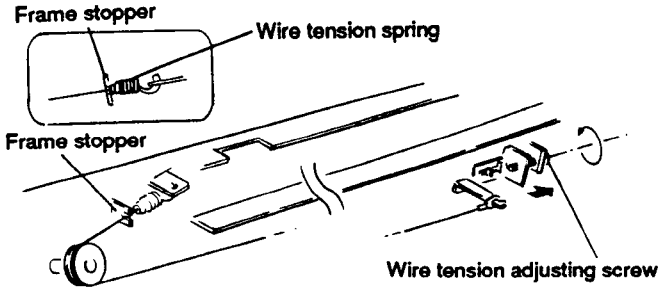
⑦ Route the mirror base drive wire as follows..

- Set the wire end with the tension spring at Ⓐ and route it Ⓑ thru Ⓔ.
  The spring must be hooked on the frame from underneath as shown.
- Route the other end of the wire in order of Ⓕ thru Ⓘ.



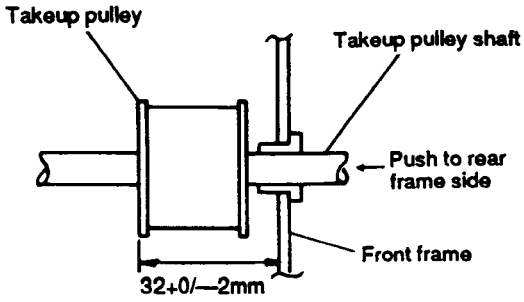
⑧ Remove the tape used in step (3) to hold the wire.

- Rotate the mirror base tension wire adjusting screw clockwise to apply tension to the wire. Stop it when the edge of the wire tension spring comes in contact with frame stopper.



- Manually move the No.2/3 mirror base unit to assure that the mirror base wire spring end makes contact with the frame stopper. If not re-adjust with the adjusting screw. Insure that no wires cross each other on the mirror base pulley.

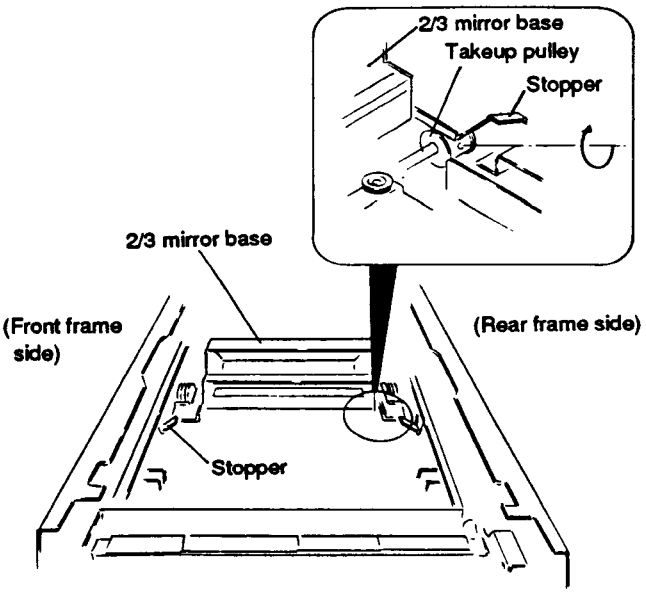
⑨ Move the No.2/3 mirror base unit to the center of the machine and secure the front frame side takeup pulley on the pulley shaft.



NOTE: Do not damage the wire when fastening the setscrew.

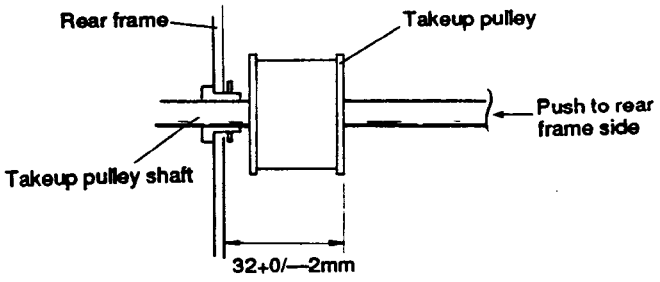
⑩ Move the No.2/3 mirror base unit until the front frame side and the rear frame side contact the stopper at the same time.

⑪ Tighten one rear frame side takeup pulley setscrew to secure it on the shaft. Move away the No.2/3 mirror base from the stopper and move it back again to see that it makes contact with the stopper at the same time as the front frame side.



⑫ If (11) above was not satisfactory, loosen the setscrew on the rear frame side and repeat steps (10) and (11) until the both side make contact at the same time.

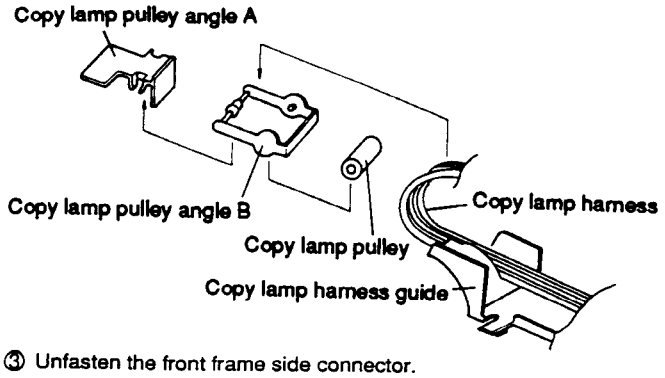
⑬ Fasten another setscrew in the rear side takeup pulley.



(4) Replacing the copy lamp leads

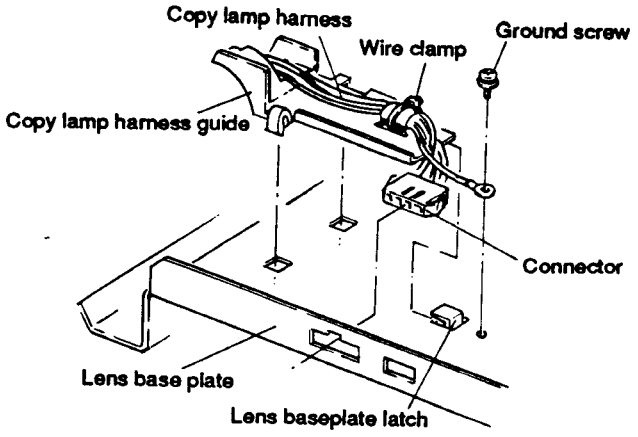
① Remove the table glass.

② Remove the copy lamp pulley angle B from the copy lamp pulley angle A, and remove the copy lamp pulley angle B from the copy lamp harness.



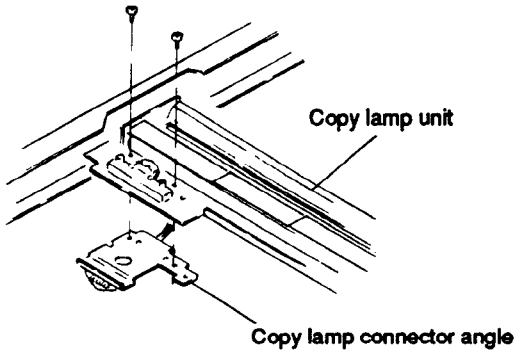
③ Unfasten the front frame side connector.
Remove the copy lamp harness connector from the frame.

④ Remove the copy lamp ground screw.
Remove the copy lamp harness guide from the lens baseplate.



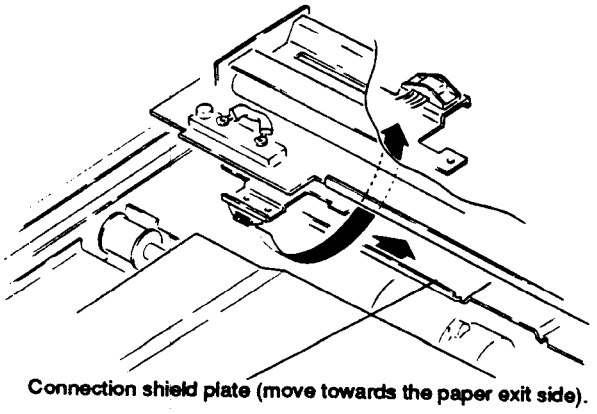
⑤ Remove the wire clamp.
Remove the copy lamp harness from the copy lamp harness guide.

⑥ Remove the copy lamp connector angle from the copy lamp unit.

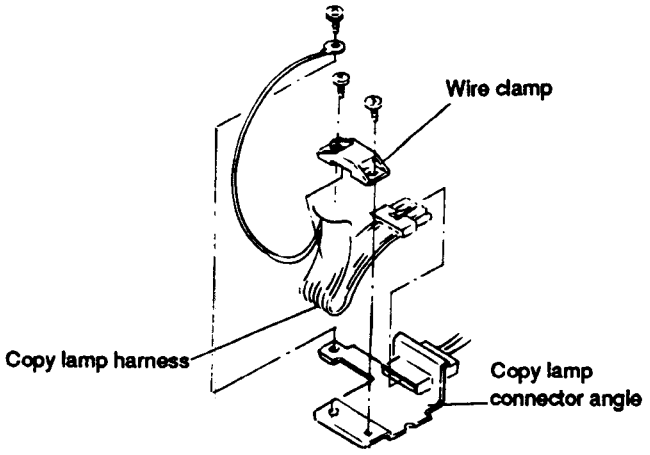


⑦ Remove the connection shield plate holding screw and move the plate towards the paper exit side.

⑧ Turn the copy lamp connector holding bracket upside down as shown in the figure.
Connection shield plate (move towards the paper exit side).

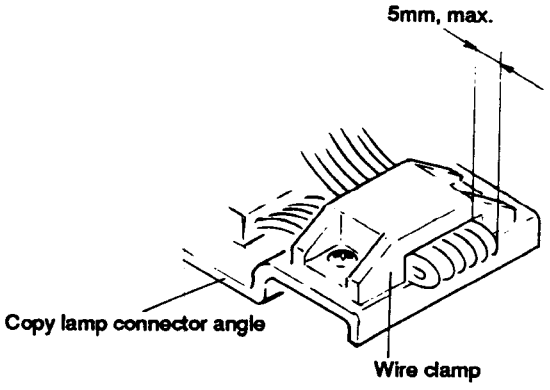


⑨ Remove the copy lamp harness from the copy lamp connector.



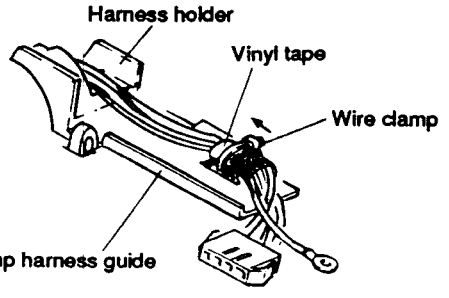
Reverse the sequence to re-assemble with the following precaution:

- The loopback portion must be within 5mm. The copy lamp harness must rest in the wire clamp groove.



NOTE: The copy lamp wires should not be seized.

- When installing the copy lamp harness on the copy lamp harness guide, the black taped portion of the copy lamp harness must be at the center of the wire clamp.
- The copy lamp harness must rest on the harness holder of the copy lamp harness guide.

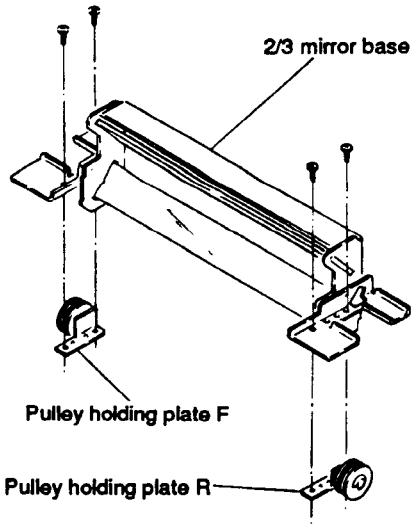


- Check that the copy lamp harness does not contact the mirror base drive wire.

(5) No.2/3 mirror base unit

① Remove the mirror base drive wire.

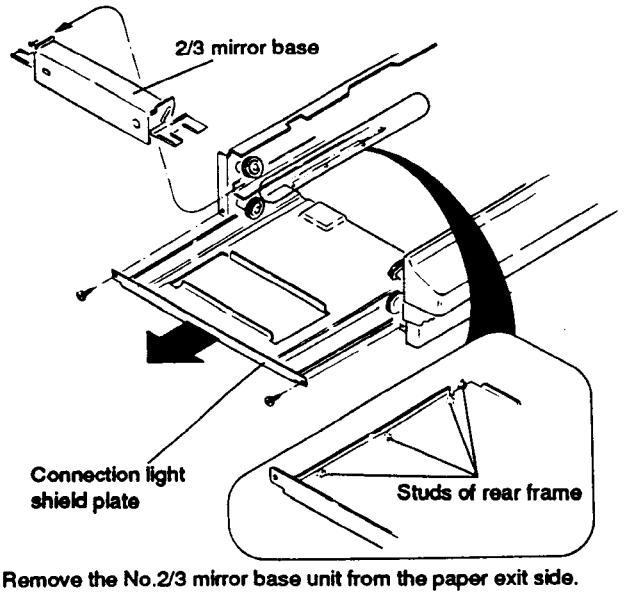
② Remove the pulley holding plates, F and R.



③ Remove the connection plate from the paper exit side.

④ Remove the main harness snap band from the connection light shield plate.

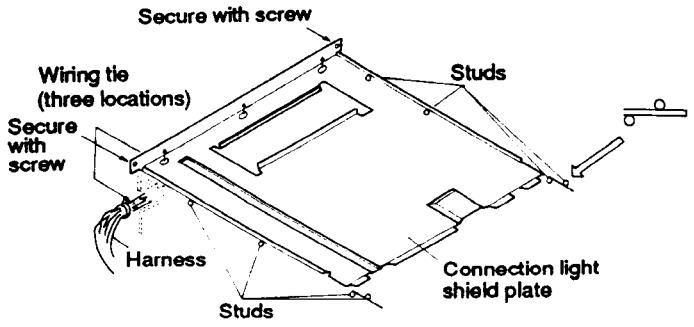
⑤ Remove the connection light shield plate.



Remove the No.2/3 mirror base unit from the paper exit side.

Reverse the sequence to re-assemble, with the following precaution:

- The connection light shield plate must be inserted over the frame studs. The inner end of the light shield plate must rest between studs as shown.



Major parts replacement (lens base related)

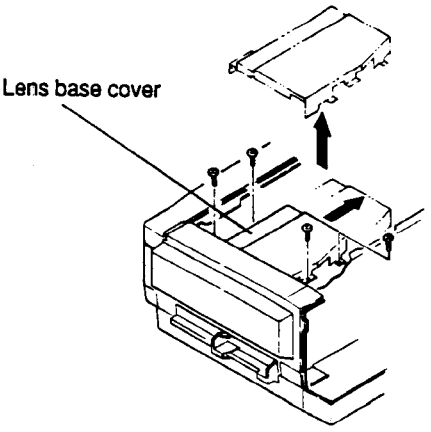
NOTE: For the drying heater is alive even if the power switch was turned off, it must be handled after unfastening the power cord from the wall outlet.

(1) LPS

① Remove the table glass.

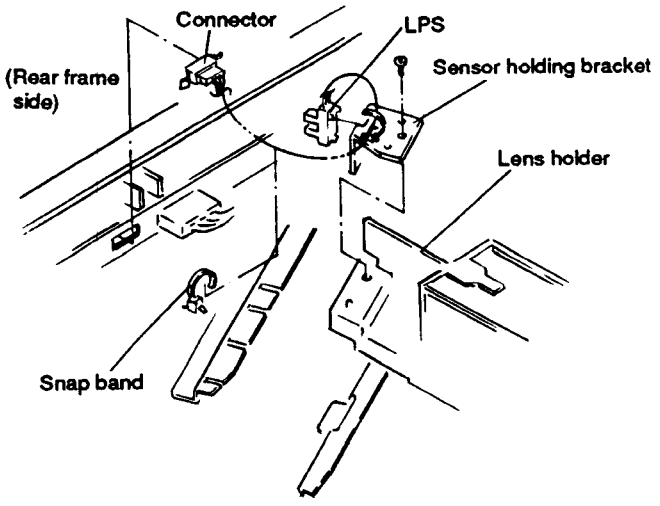
② Move the copy lamp unit towards the paper exit side.

③ Remove the lens base cover (four screws).



④ Remove the operation panel.
Remove the connector.

⑤ Remove the snap band.
Remove the LPS from the sensor holding bracket.



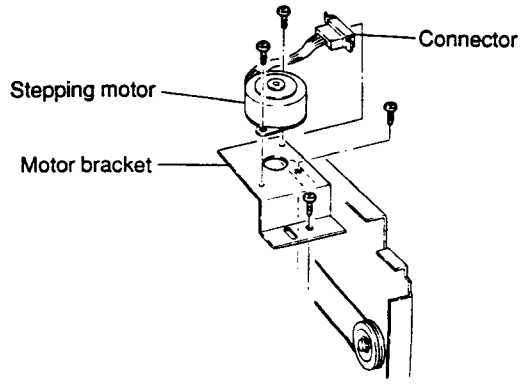
(2) Stepping motor

① Remove the lens base cover.

② Remove the stepping motor from the motor bracket (two screws).

③ Remove the connector from the frame.

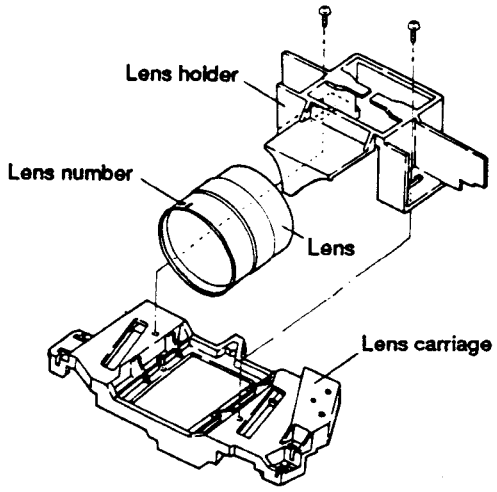
④ Unfasten the connector and remove the stepping motor.



(3) Lens

① Remove the lens base cover.

② Remove the lens from the lens carriage.
Remove the lens.



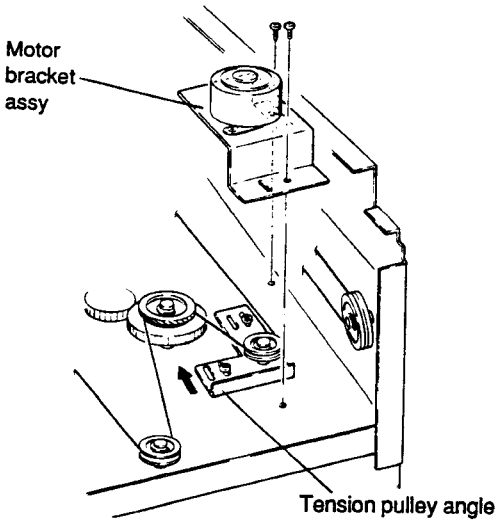
(4) Lens drive wire (SF-7370 only)

(Removing the lens drive wire)

① Remove the lens base cover.

② Remove the motor bracket assy.

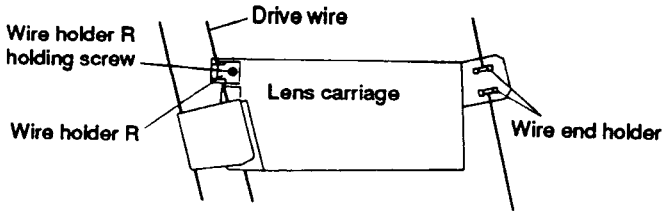
③ Loosen the tension pulley angle holding screw and loosen the wire tension.



④ Loosen the wire holder R holding screw.
Remove the wire from the lens carriage.

⑤ Remove the wire end holder from the lens carriage.
Remove the wire.

⑥ Remove the wire.



Stretching the lens drive wire (SF-7370 only)

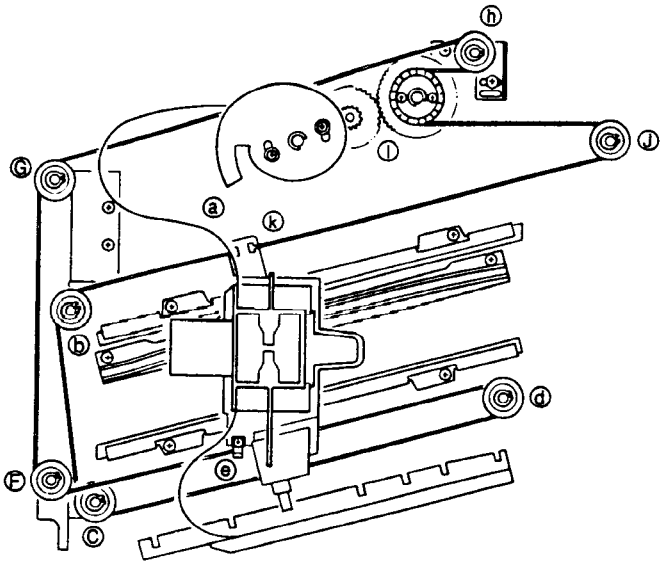
* When replacing the drive wire, loosen the tension pulley holding angle screw to release tension.

① Move the lens carriage unit to the normal position (x1.0).
Match the LPS to the normal position of the slit plate.

② Insert the metal end at the location of No. ⓐ.

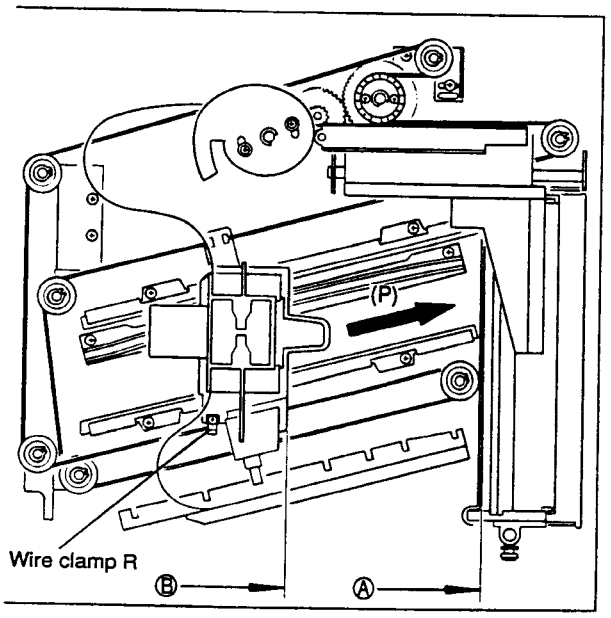
③ Route the wire in order of No. ⓑ to No. Ⓙ.
At ⓔ, insert the wire between the wire clamp and the lens carriage wire holding bracket.

④ Insert the end of the wire into No. Ⓚ.



⑤ Fasten the wire clamp R fingertight with screw.

⑥ Manually move the carriage towards the arrow direction (P), match the line Ⓐ at the edge of a hole in the baseplate with the line Ⓑ at the edge of the lens carriage, and fasten the wire clamp R screw.
When the lens carriage is to be moved, hold the lens drive gear and do not hold the carriage itself.



* Whenever the lens drive wire is replaced or removed, it will need to adjust the cam guide, No.4/5 mirror shift cam normal position (x1.0), and the lens drive wire tension.

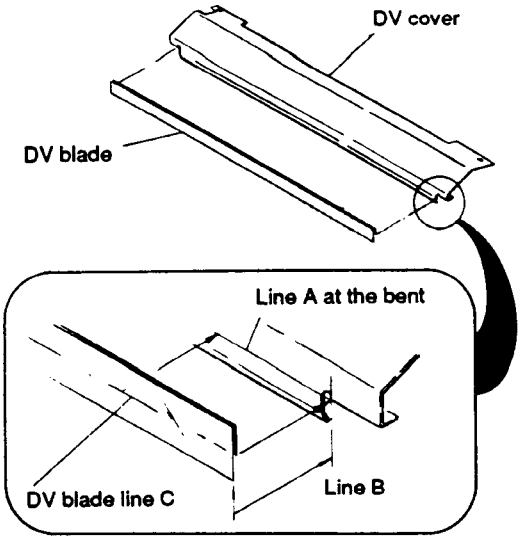
3. Developer unit

(1) DV blade

The DV blade sheet must be replaced every 120,000 copies.

① Remove the DV blade, which is bonded with double sided tape from the DV cover.

② Bond a new DV blade as illustrated in the figure.
Match the line A of the DV cover bent portion with the line C of the blade and bond it together using line B as a reference



③ Peel the backing from DV blade and install it on the DV cover.

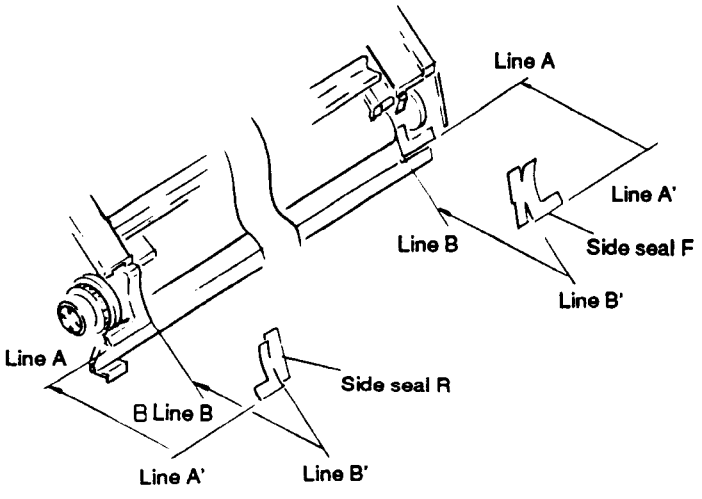
NOTE: The backing paper must be completely peeled away to avoid scratching the drum.

(2) DV side seals, L and R

The seals must be replaced every 120,000 copies.

① Remove the toner cover from the developer unit.

② Bond the MG side seals as shown in the figure below, using the base line as a reference.



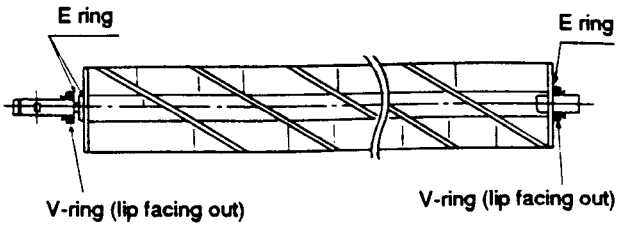
- Align line A with line A' and line B with line B' then bond in position.

NOTE: Since the DV side seals are close to the OPC drum, insure that they do not peel and damage the drum surface..

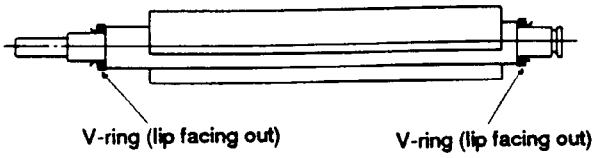
(3) V-ring installation

Note the installing direction of V-rings attached to the stirring roller and the MX roller and install them as shown in the figure.

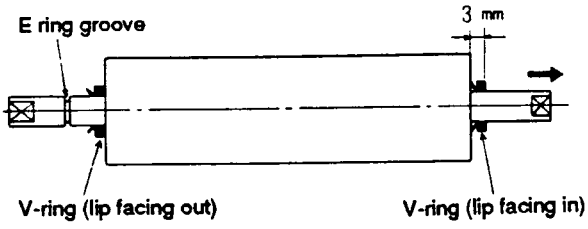
a) MX roller



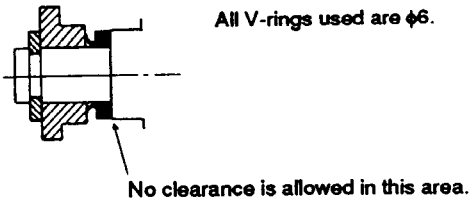
b) Stirring roller



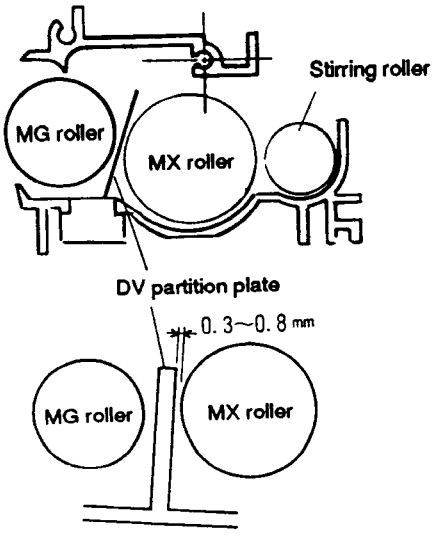
c) MG roller



NOTE: When the V-ring is pulled towards the arrow direction, it must be 3mm from the edge of the MG roller.



NOTE: Ensure when re-assembling that the DV partition plate is not in contact with the MG roller and MX roller.



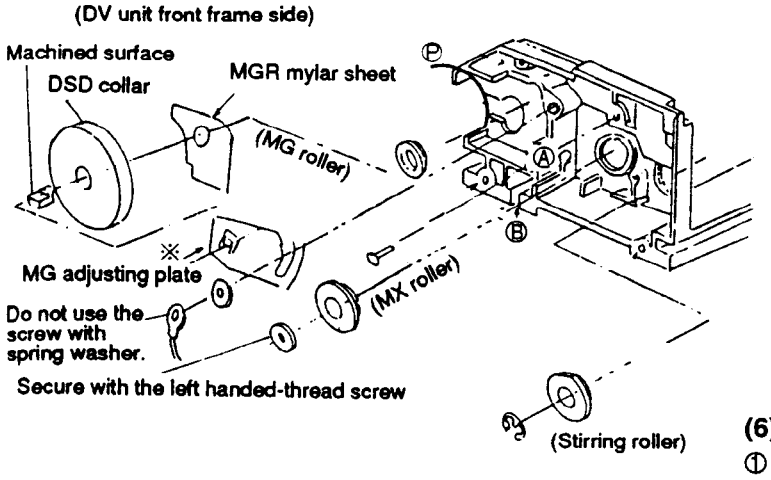
(4) Precautions in assembling the DV unit front side

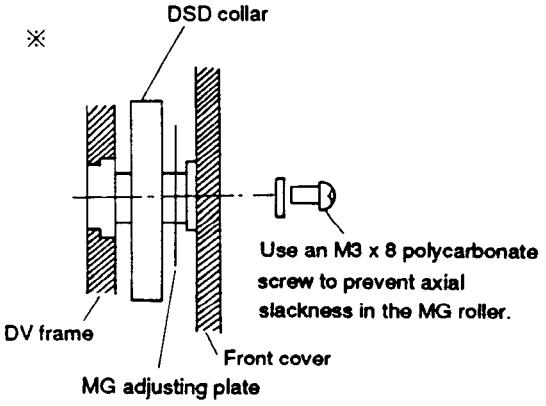
① The machined surface of the MG roller shaft must face up when installed.

② The MX roller must be fastened with a left handed-thread screw.

③ The harness must be firmly pushed into the groove of Ⓐ and Ⓑ.

④ The MGR mylar sheet must be bonded in alignment to the center of hole of the DSD collar.




※
DSD collar
Use an M3 x 8 polycarbonate screw to prevent axial slackness in the MG roller.
DV frame
Front cover
MG adjusting plate

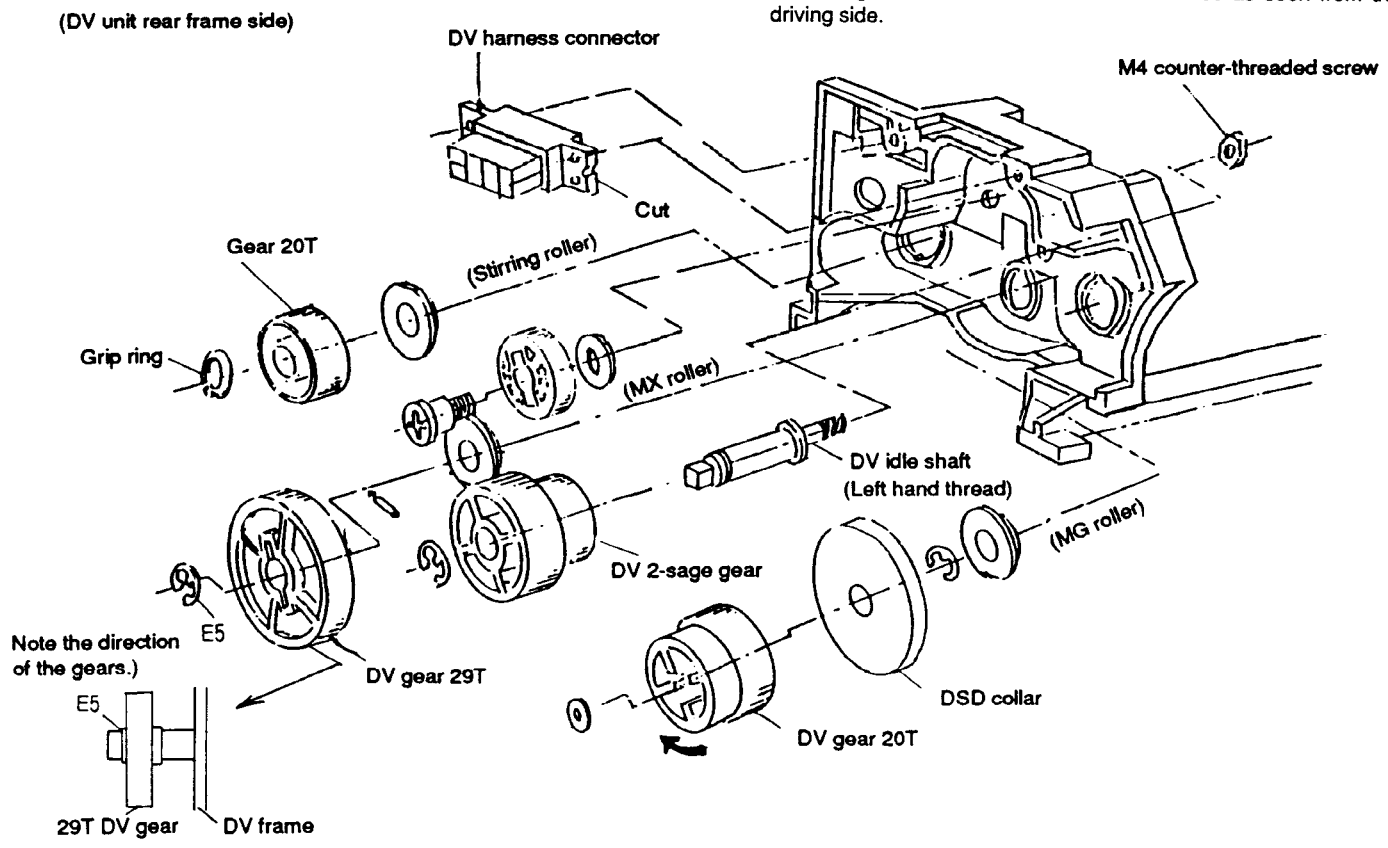
(5) Precaution in assembling the DV unit rear side

① Install the DV harness connector with its cut on the right side.

② Note that the DV idle shaft is a left hand thread.

③ The gear train must be assembled in the order of DSD collar, DV 2-stage gear, DV gear 20T, and the connector.

④ The stirring roller gear (20T) must be inserted completely before securing with the grip ring.



(6) Check items

① The DSD collars must rotate smoothly when installed.
Check the DSD collar on the driving side by pushing the 20T gear against the DSD collar.
Check the front frame side DSD collar that there is a slight clearance between the MG adjusting plate and the MGR mylar sheet.

② Check by rotating the (20T) DV gear in the arrow direction. The MG roller should rotate smoothly without excessive noise.

Other precautions

- Because this developer unit operates under the normal rotation direction, developer might leak if rotated in the other direction.
  The DV gear 20T has to be rotated clockwise as seen from the driving side.

4. Fuser unit

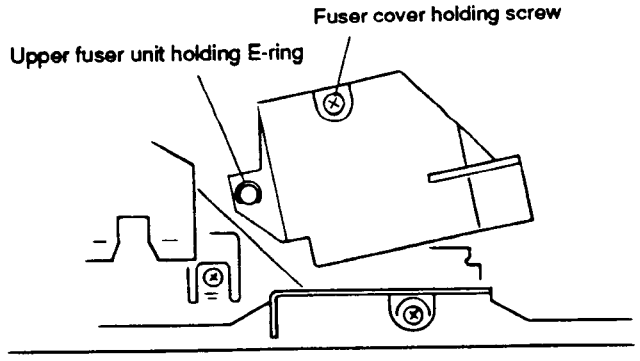
Major parts replacement

The upper fuser unit must be removed before replacing a component.

(1) Removing the upper fuser unit

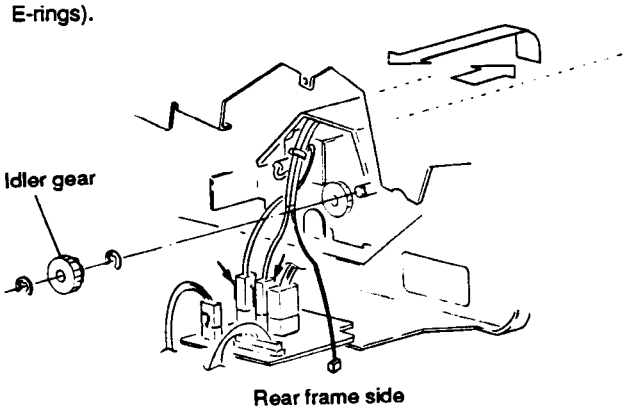
① Open the clam shell mechanism and remove the rear panel.

② Remover the fuser cover (one screw).



③ Remove the front frame side upper fuser unit holding E-ring.

④ Remove the rear frame side connectors (three) and the idler gear. Push the upper fuser unit in the arrow direction to remove (two E-rings).



- Reverse the sequence to re-assemble.

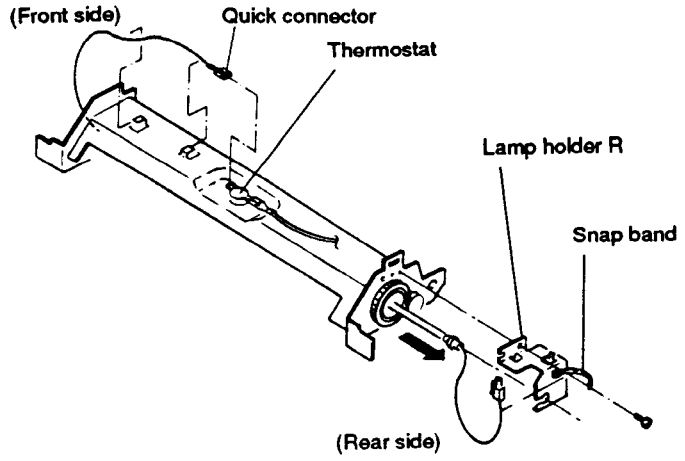
(2) Heater lamp

① Remove the upper fuser unit.

② Remove the snap band on the rear side of the upper fuser unit.

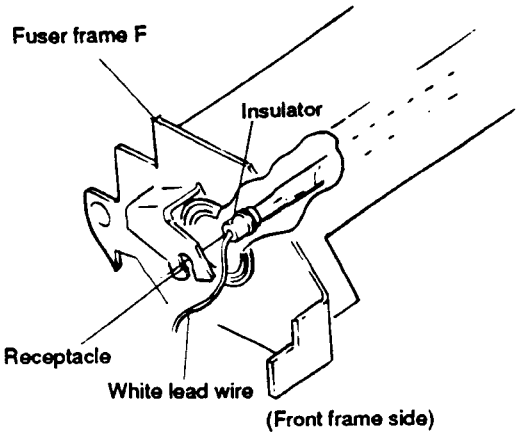
③ Remove the quick connector on the front side of the thermostat.

④ Remove the lamp holder R (one screw).
Take out the heater lamp in the arrow direction.

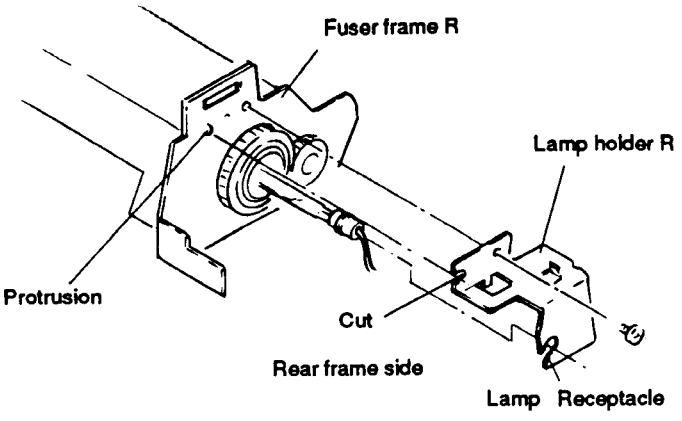


Re-assembly

① Insert the white lead end of the heater lamp through the heat roller R side and set the insulator in the receptacle of the fuser frame F.



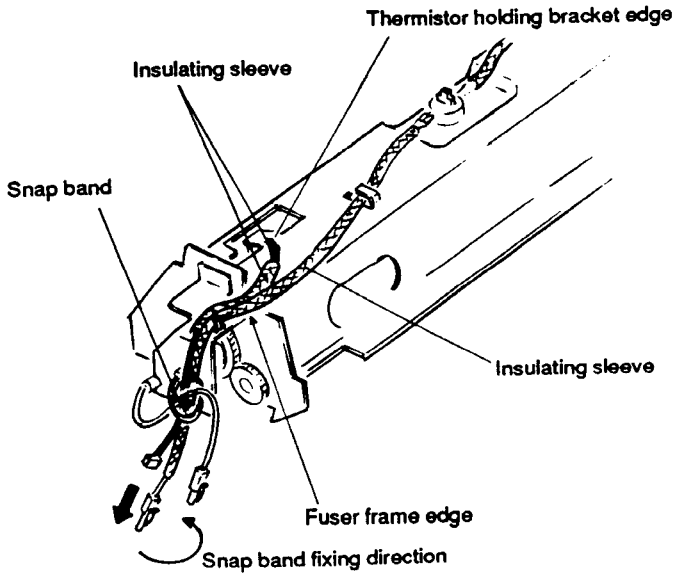
② Set the rear frame end of the lamp into the lamp holder R. Match the cut in the lamp holder to the protrusion of the fuser frame R, then secure it with a screw.



(Wire routing)

Note the following to set wires using snap band.

- Insulating sleeve should be located over the fuser frame edge or thermistor holding bracket. Leads should not come in direct contact with the edges of the fuser unit.
- Slightly stretch the harness in the arrow direction to remove loose installation and hold the wires with a snap band.

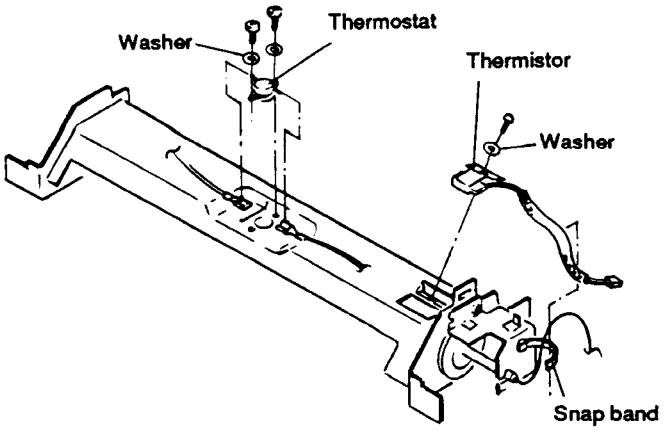


(3) Thermistor, thermostat

① Remove the upper fuser unit.

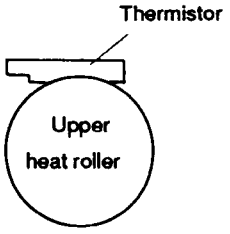
(Thermistor)
Remove the snap band.
Remove the thermistor (one screw).

(Thermostat)
Remove the quick connector.
Remove the thermostat (one screw).

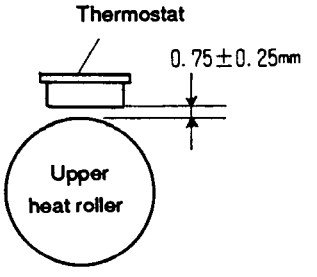


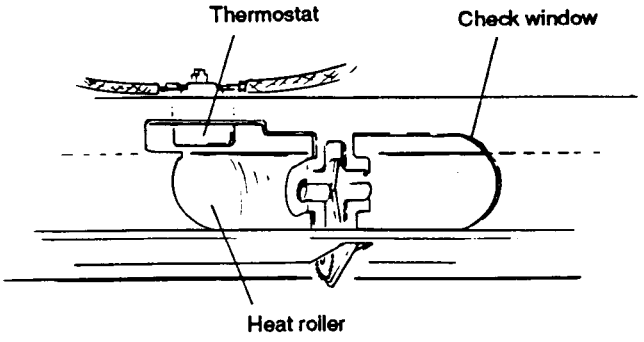
- Check-out after installation

(Thermistor)
The thermistor must rest firmly on the upper heat roller.



(Thermostat)
Make sure that the clearance between the upper heat roller and the thermostat is 0.75±0.25mm when upper heat roller has pushed up by the lower pressure roller.



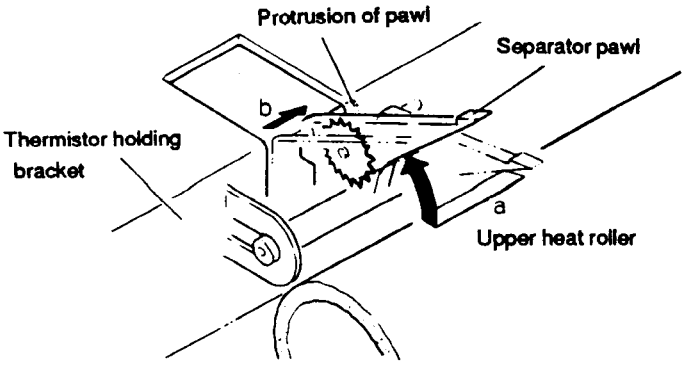


(4) Upper heat roller

① Remove the heater lamp.

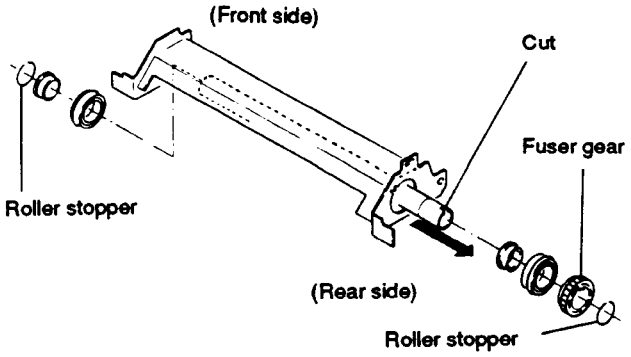
② Remove the separator pawl spring.

③ Remove the separator pawl from the upper heat roller.
(Set the protrusion of the pawl on the thermistor holding bracket in order of "a" and "b" as shown below.



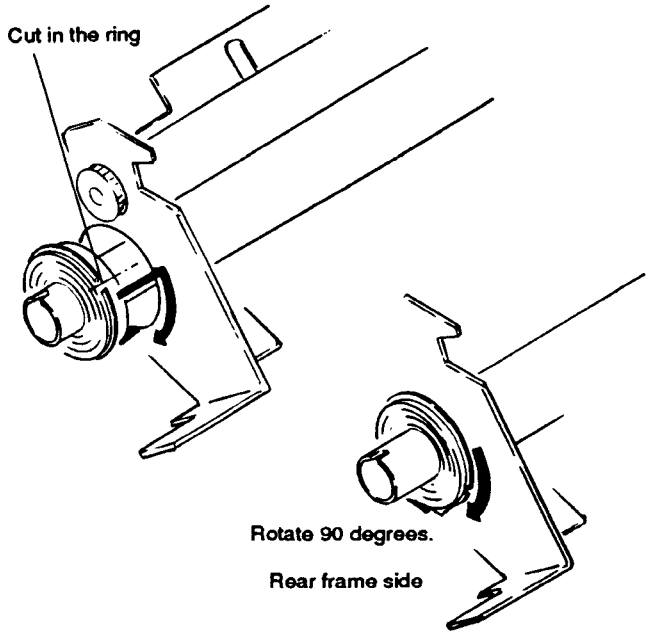
④ Remove the front side roller stopper using the C-ring pliers.

⑤ Remove the front side bearing.
Remove the heat roller in the arrow direction carefully, to avoid scratching it.



Re-assembly

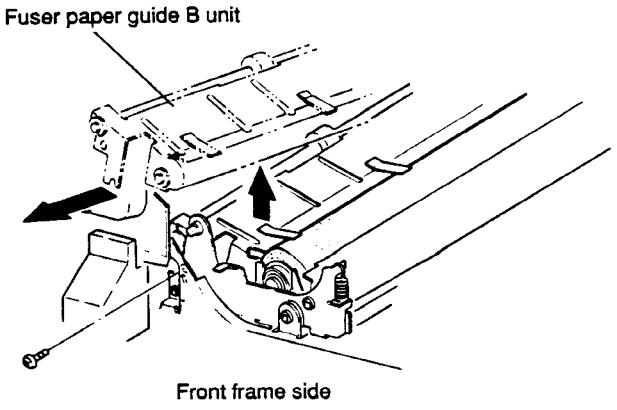
- Note the position of the bearing when installed.

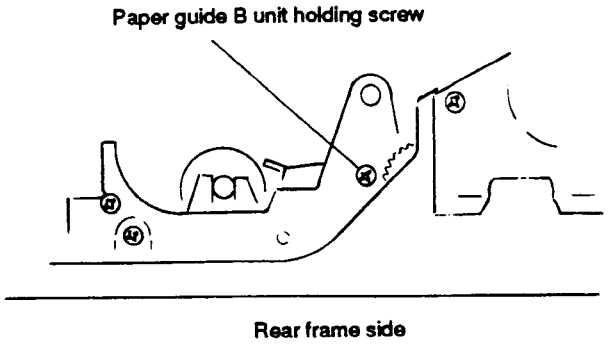


(5) Lower heat roller

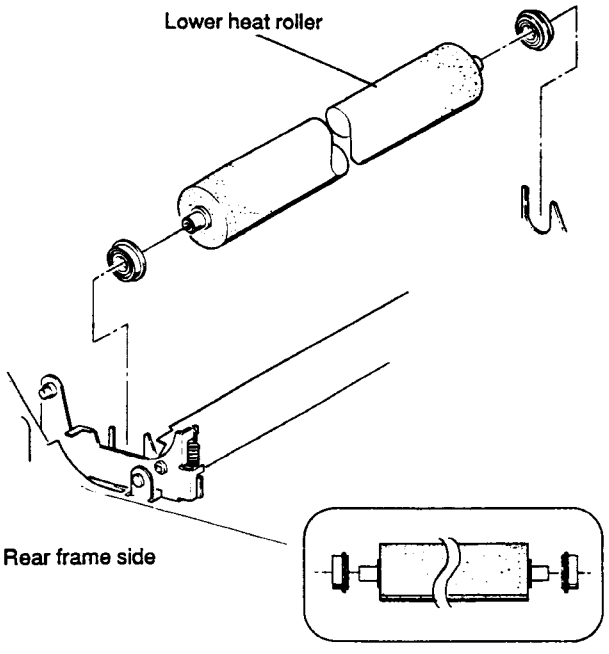
① Remove the upper fuser unit, reference to 1-A-(1) to (4).

② Remove the fuser paper guide B unit (two screws).



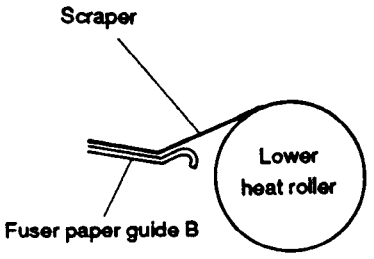


③ Remove the lower heat roller.



Re-assembly

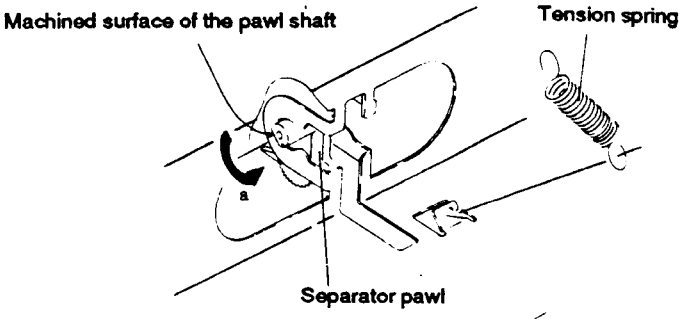
- Do not scratch the lower heat roller with the scraper, when installing the fuser paper guide B unit.
- Make sure that the top end of the scraper is in contact with the lower heat roller as illustrated.

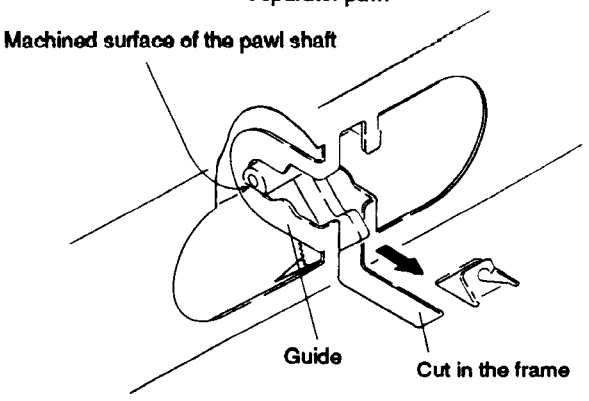


(6) Separator pawl

① Remove the upper fuser unit.

② Remove the tension spring.
Rotate the pawl in the arrow direction "a" and match the machined surface of the pawl shaft to the guide.
Remove the separator pawl through the cut in the guide.



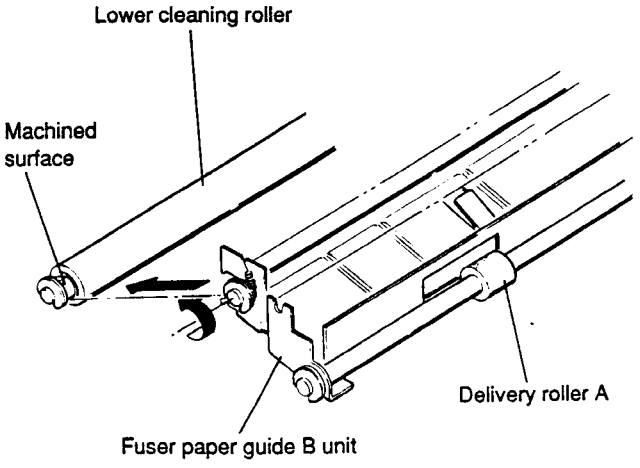


(7) Cleaning roller

① Remove the upper fuser unit.

② Remove the fuser paper guide B.

③ Match the machined surface of the bearing and remove the cleaning roller from the fuser paper guide B unit.

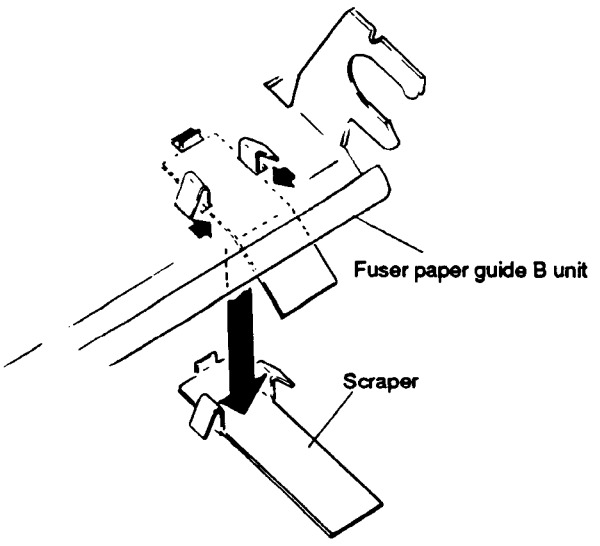


(8) Scraper

① Remove the upper fuser unit.

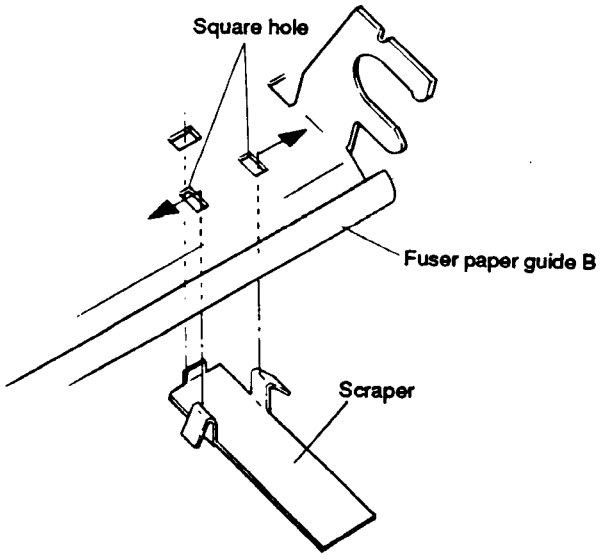
② Remove the fuser paper guide B unit.

③ Push the shank of the scraper in the arrow direction and remove it from the fuser paper guide B unit.



Re-assembly

① Insert the bend of the scraper into a square hole in the fuser paper guide B.
Push it through the holes until it appears on the other side.

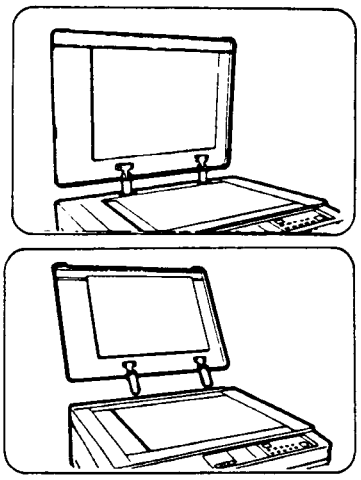


5. Others

Exteriors

(1) Document cover

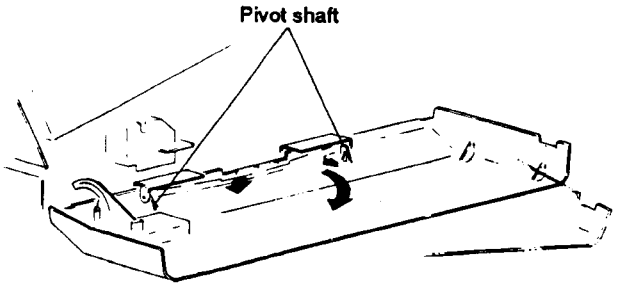
Open the document cover and lift the document cover up.
Tilt it upright and remove the document cover hinge, L and R, from the document cover hinge guide, L and R.



(2) Front panel

Gently push the center of the front panel to release the right side latch and remove the panel.

NOTE: Do not deform the pivot shaft.



(3) Rear panel

Remove two screws and pull it back to remove.

(4) Lower left panel

Remove two screws.
Slightly lift it up and release the latch at two locations to remove.

(5) Upper left panel

Remove two screws.
Lift the bottom of the panel up and left and release engagement from three latches inside.

NOTE: Do not break latches.

(6) Right panel

Remove two screws.
Lift the bottom of the panel up and right and release engagement from three latches inside.

NOTE: Do not break latches.
When replacing, make sure that the latches are properly engaged at the both sides of the manual feed block.
Don't scratch the rib of the paper transport section (U-turn part).
(It will be the cause of jam.)

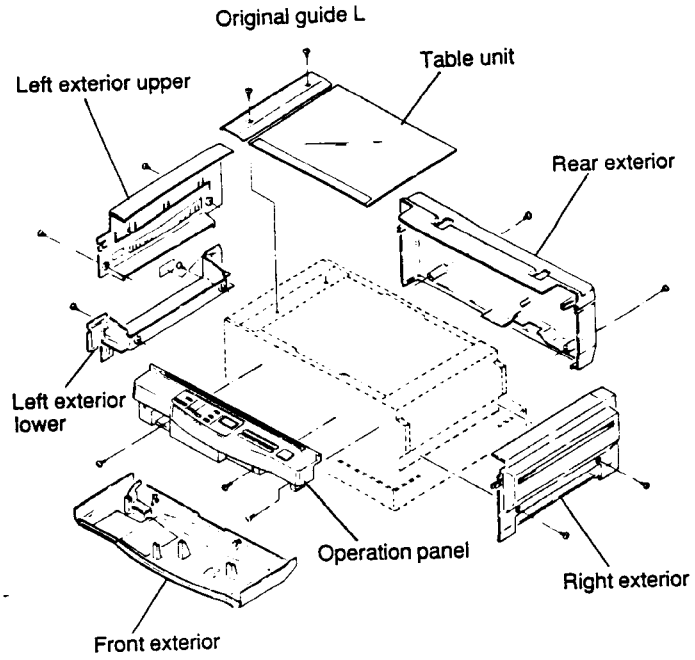
(7) Operation panel

Remove two screws.
Lift up both sides of the panel and release engagement from latches inside.
Pull it back to release engagement from two other latches inside.

NOTE: Do not break latches.

(8) Table glass

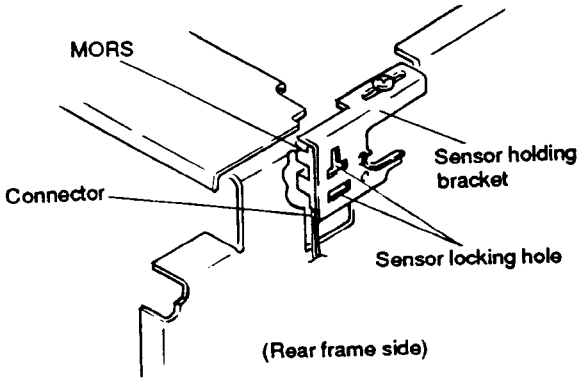
Remove the glass holder.
Remove the table glass.

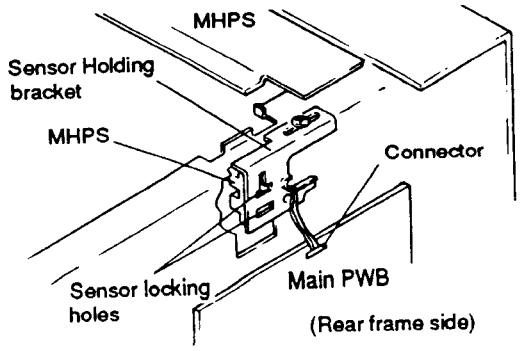


Sensors

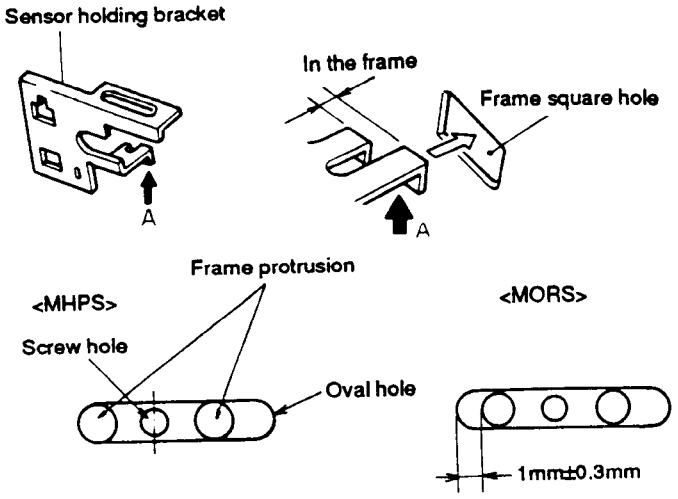
(1) MHPS, MORS

① Remove the rear panel.
② Remove the sensor holding bracket.
③ Unfasten the connectors.
MHPS: Unfasten the MHPS connector from the main PWB. Leads are extended from the sensor.
MORS: Unfasten the connector from MORS. Leads do not extend from the sensor.
④ Release lock from latch to remove the sensor from its bracket.





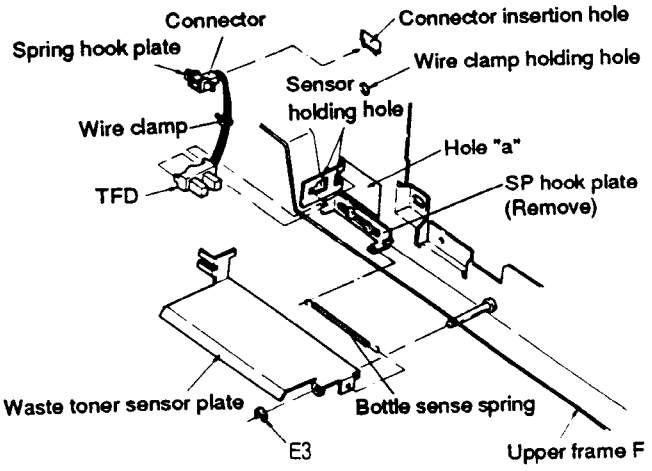
- Reverse the sequence to re-assemble and note the following:
  - Insert the portion A of the sensor holding bracket in the frame and set the center of the screw holes to the center of the oval holes.



If the copy lamp unit hits the frame when moving forward or backward, change the location of the sensor holding bracket.
If the location of the MHPS is changed, copy lead edge must be adjusted.

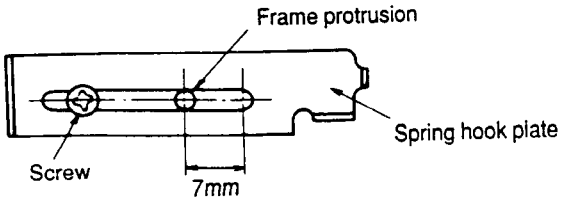
(2) TFD

① Remove the operation panel (two screws).
② Unfasten the TFD connector.
Remove the wire clamp from the frame.
③ Remove the bottle sense spring.
Remove SP hook plate.
Remove the waste toner sense plate (one E-ring).
④ Remove the TFD through the sensor installing hole and take out the connector through the hole "a".



(Re-assembly)

Reverse the sequence to re-assemble.
After replacement or removal of the spring hook plate, it has to be installed in the base location shown below.



NOTE: With the plate installed in the above location, the full waste toner will be detected at 35 grams. Changing the position of the plate 1mm changes the sensing level by 3 grams.

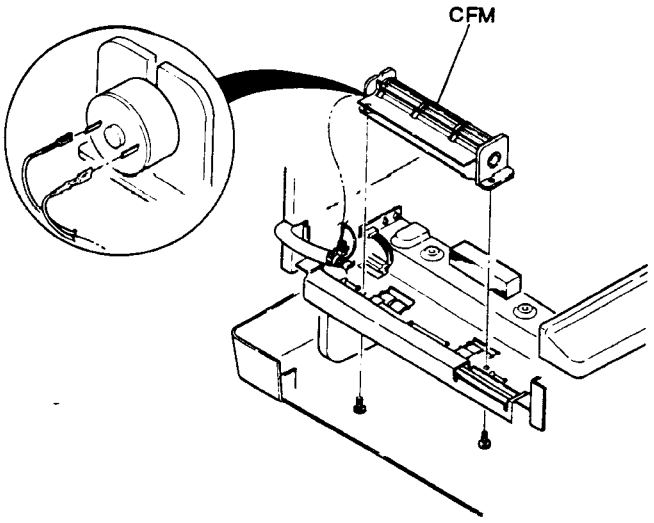
(3) POD

① Open the clam shell.

② Remove the rear panel.

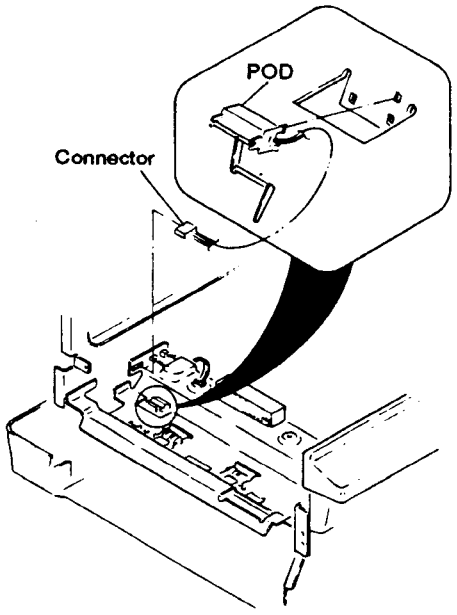
③ Remove the connection light shield plate.

④ Remove the CFM.



⑤ Release the lock of the POD.

⑥ Unfasten the connector and remove the POD.



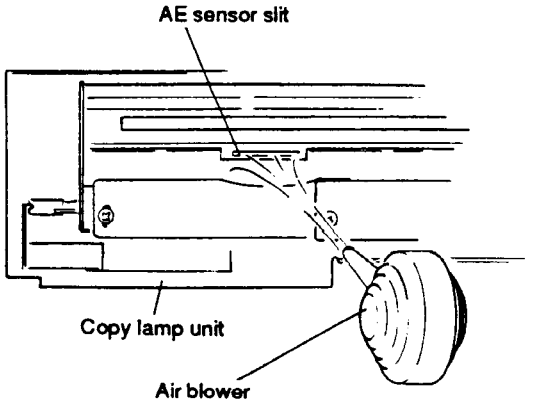
(Re-assembly)

Follow the reverse sequence to re-assemble.
Make sure that the actuator of the POD returns by its own weight.

(4) Cleaning the AE sensor

The AE sensor must be cleaned at every maintenance.

① Blow air through the AE sensor slit with the air blower to clean away dust on the AE sensor surface.

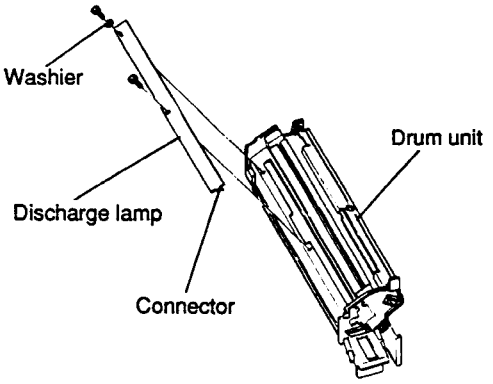


Drum unit

(1) Discharge lamp

① Remove the drum unit from the copier.

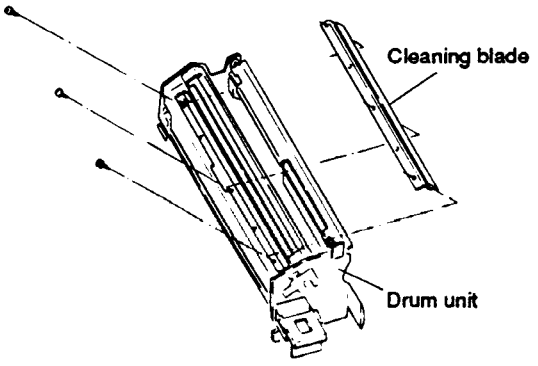
② Remove the discharge lamp from the drum unit (two screws).



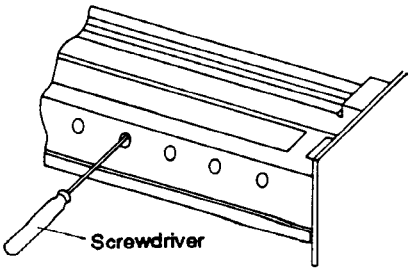
(2) Cleaning blade

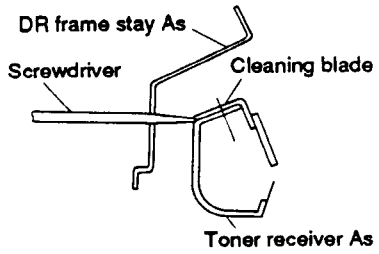
① Remove the discharge lamp.

② Remove the cleaning blade (two screws).



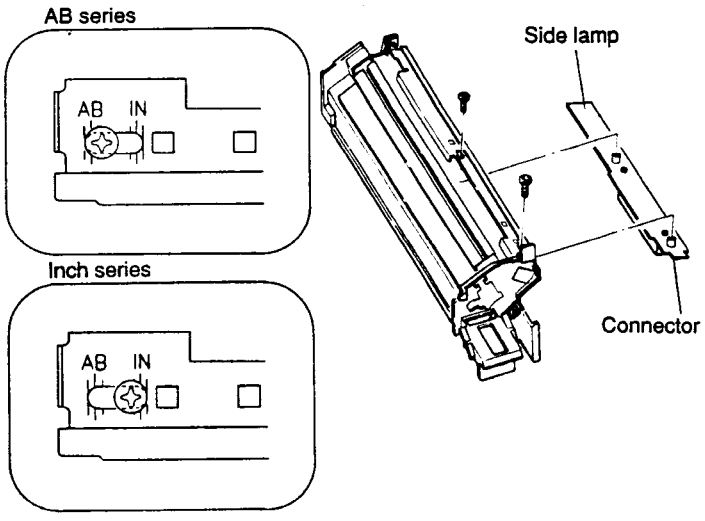
- If the cleaning blade were to remain stuck to the support plate (toner receiver assy), insert a screwdriver through the ϕ6 hole in the drum frame stay assy as shown in the figure. Apply the tip of the screwdriver in a gap between the toner receive assy and the cleaning blade, and pry it to remove.





(3) Blank lamp

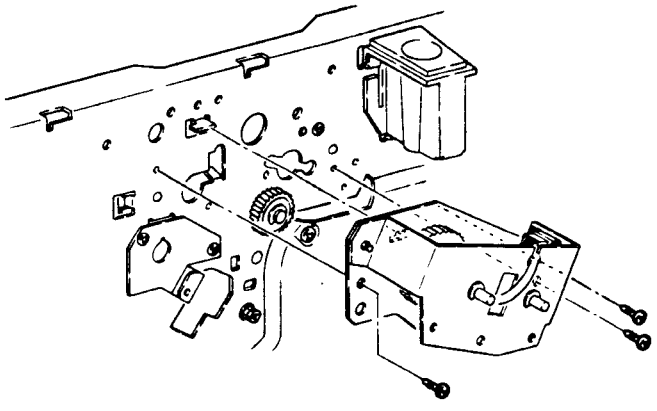
① Remove the drum unit from the copier.
② Remove the side lamp from the drum unit.

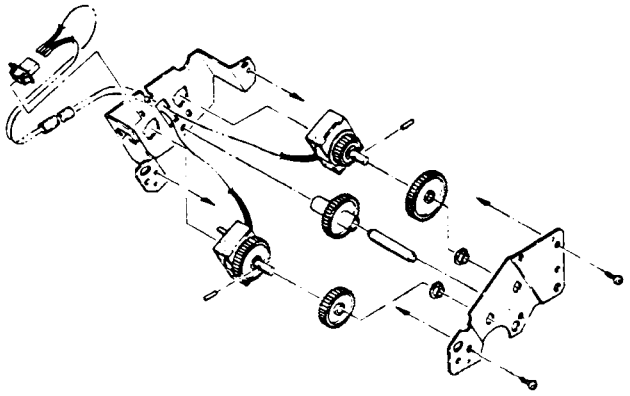


Drive train

(1) Clutch unit (SF-7320 only)

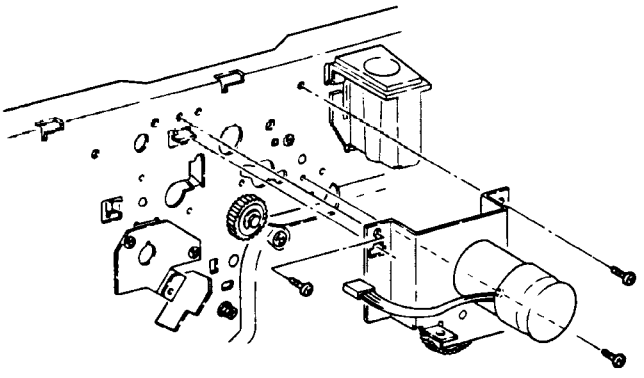
① Remove the rear panel (two screws).
② Unfasten connector and wire clamp.
③ Remove the clutch unit (three screws).

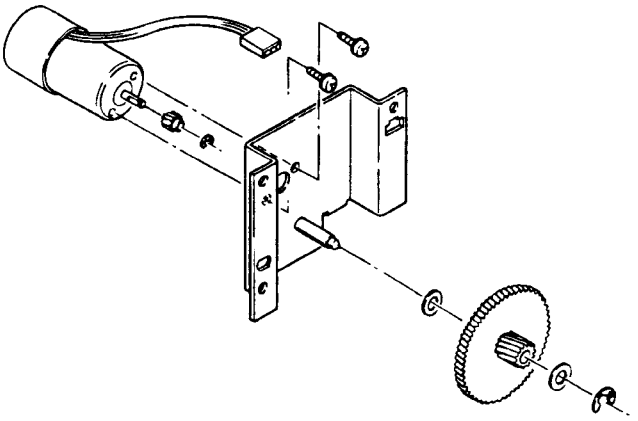




(2) Mirror motor unit (SF-7370 only)

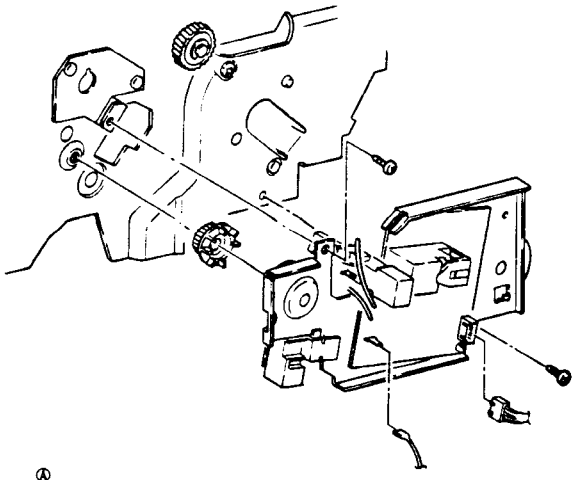
① Remove the rear panel (two screws).
② Unfasten connector and wire clamp.
③ Remove the mirror motor unit (three screws).

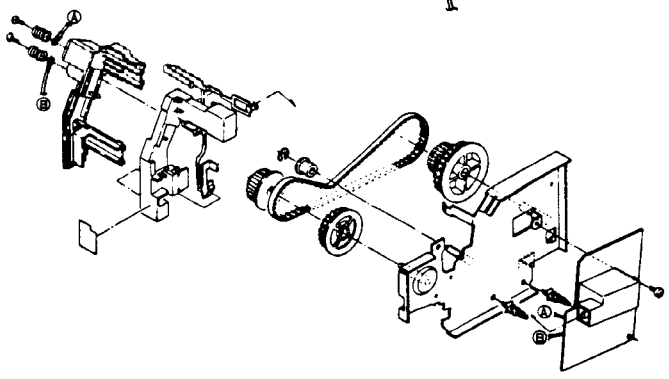




(3) HV PWB box unit

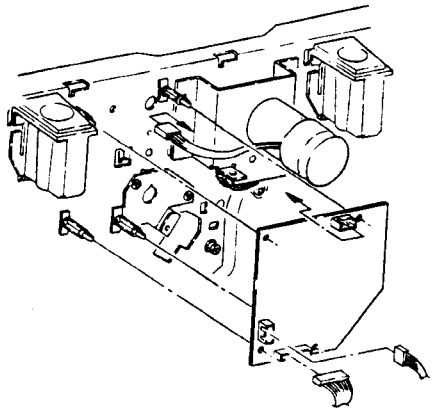
① Remove the rear panel (two screws).
② Remove the clutch unit.
③ Remove the HV PWB box unit (two screws).



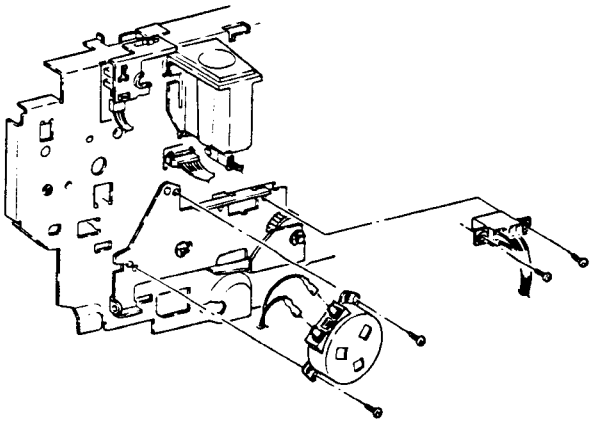


(4) DV drive unit, toner motor

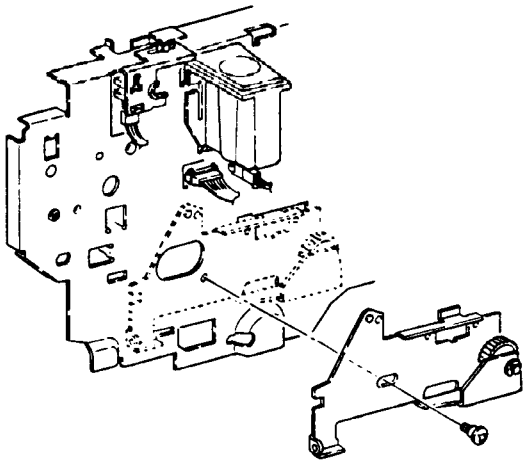
① Open the front door.
② Take out the DV unit and the process unit from the machine.
③ Remove the rear panel (two screws).
④ Remove the HV PWB box unit (two screws).
⑤ Remove the motor control PWB unit (SF-7370 only).

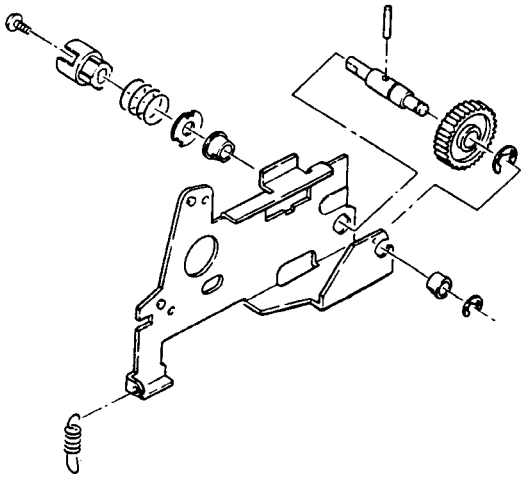


⑥ Unfasten the DV harness connector from the DV drive unit (two screws).
⑦ Remove the toner motor from the DV drive unit (two screws).



⑧ Remove the DV drive unit (two screws).

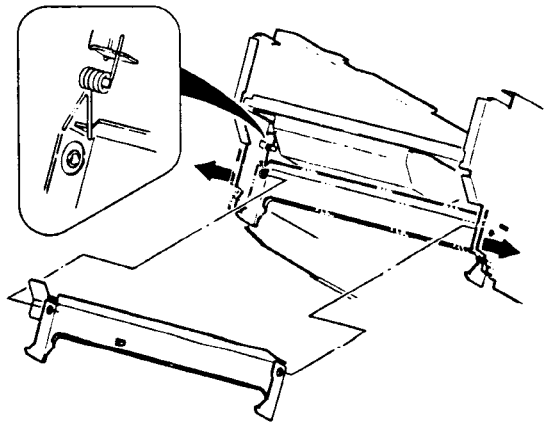




(5) DV guide unit, PG-C unit, lower dark box cover

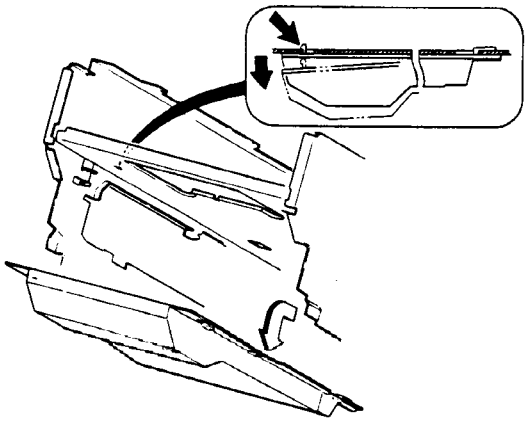
① Open the front door.
② Take out the DV unit and the process unit from the machine.
③ Remove the rear panel (two screws).
④ Remove the HV PWB box unit (two screws).
⑤ Unfasten the DV harness connector from the DV drive unit (two screws).
⑥ Remove the DV drive unit (two screws).
⑦ Remove the DV guide unit (four screws).

⑧ Remove the copier lock plate N (two screws).



⑨ Remove the paper guide C unit (four screws).

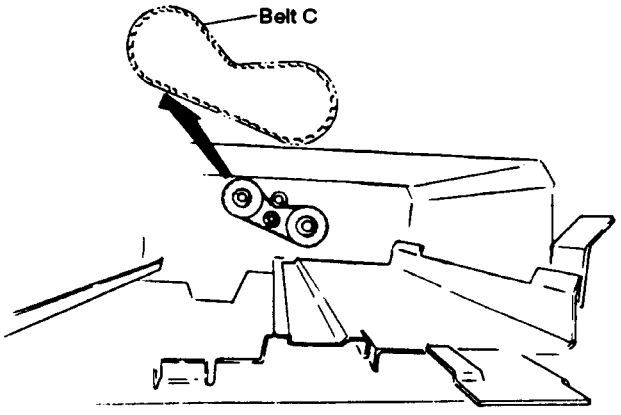
⑩ Remove the lower dark box cover.



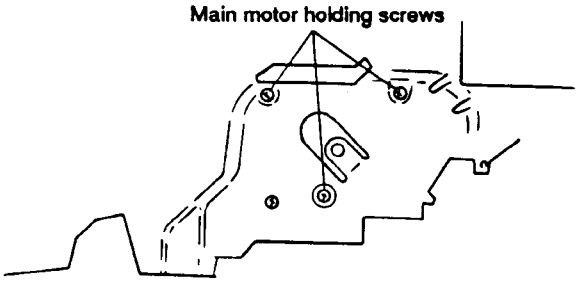
(6) Drive belts

① Do steps ① thru ⑨ in (5) above.

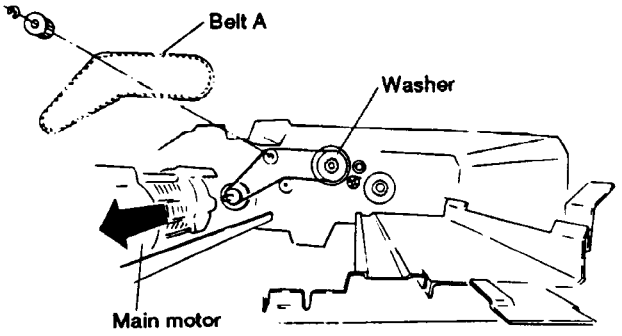
② Remove the MXL belt C.
Remove the MXL pulley spacer.



③ Remove the main motor holding screws (three) and remove the main motor shaft from the frame.



④ Remove the MXL belt A.



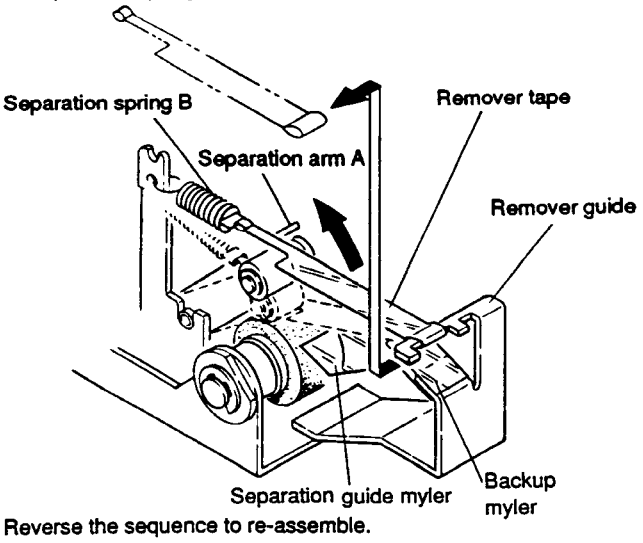
Separation block major parts replacement

(1) Remover tape

① Open the clam shell.

② Lift up the separator arm A and take out the remover tape from above the tension roller.

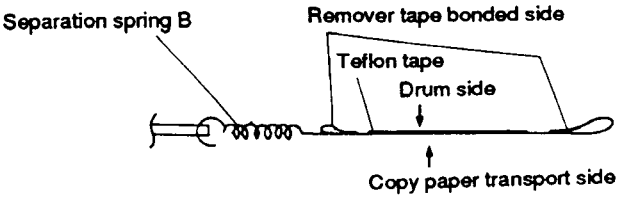
③ Remove the remover tape from the remover guide and the separation spring B.



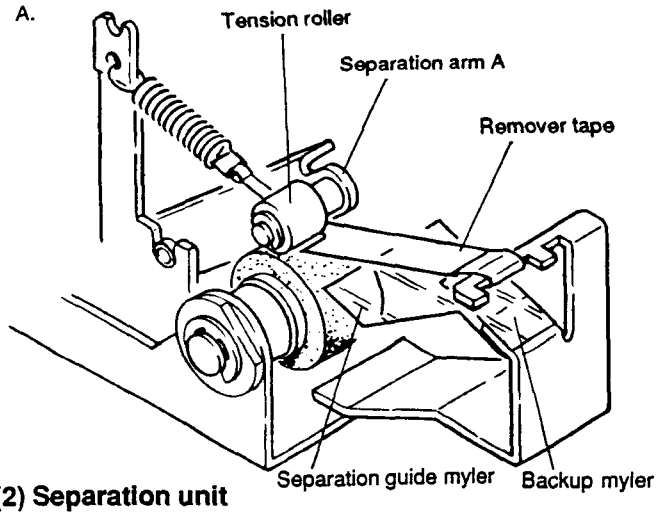
Reverse the sequence to re-assemble.

(Precautions for re-assembly)

- Install the remover tape as shown below.
  Teflon tape is bonded on the backside of the loop.



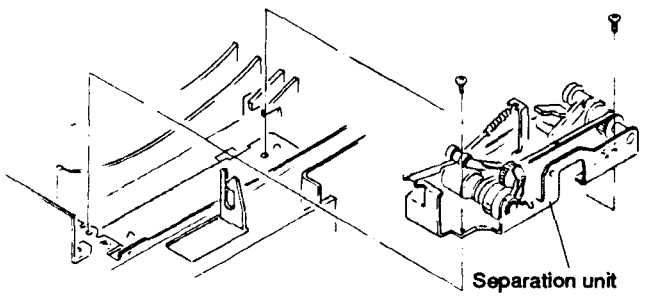
- The remover tape must rest between the tension roller and the separation arm A. The tape must be engage the separation roller A.



(2) Separation unit

① Open the clam shell.

② Remove the separation unit from the copier (two screws).

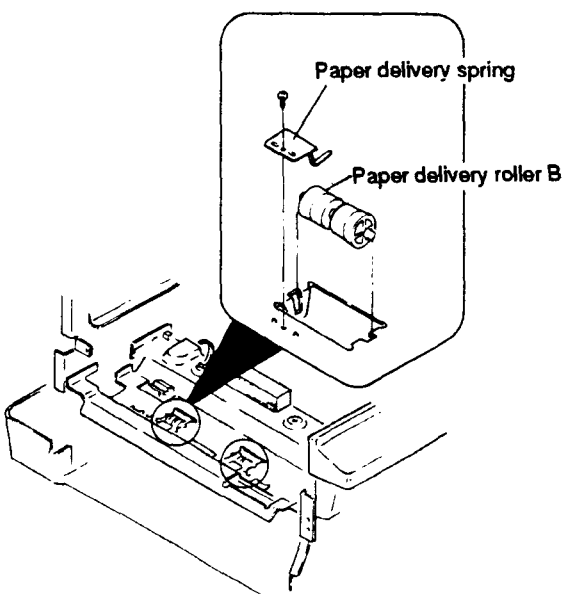


Paper exit block

(1) Paper delivery roller B

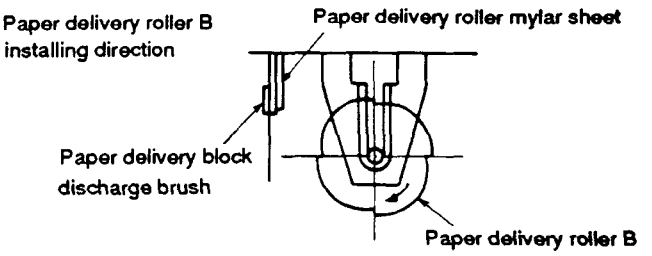
① Remove the CFM.

② Remove the paper delivery roller spring.
Remove the paper delivery roller B.



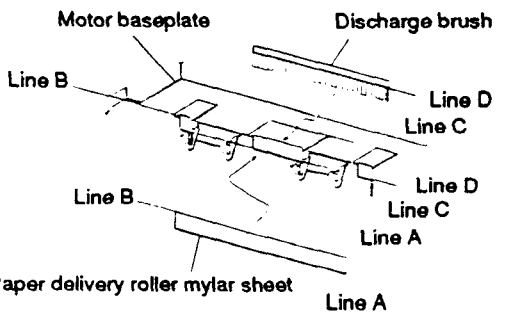
(Re-assembly)

- Reverse the sequence to re-assemble and note the installing direction of the paper delivery roller B.


Paper delivery roller B installing direction
Paper delivery roller mylar sheet
Paper delivery block discharge brush
Paper delivery roller B

(2) Paper delivery roller mylar sheet, discharge brush

Bond those items in alignment to the base lines, A, B, C, D.



Servicing main control PWB

① Service parts main control PWB initial settings

No.	Item	Setting	Description
1	Counter	0	All counters such as total, maintenance, and developer counters
2	Magnification ratio fine adjustment	5	Can be achieved by the test command 48.
3	Lead edge adjustment	0	Can be achieved by the test command 50.
4	Destination	00	Can be changed using the test command 79.
5	Maintenance counter setting	2	2500 sheets. Can be changed using the test command 72.
6	Drum cleaning mode	10	10-second mode. Can be changed using the test command 90..
7	Manual feed mode	0	Auto start. Can be changed using the test command 97.
8	Fuser temperature setting	80	180 centigrade. Can be changed using the test command 96.

② Setup procedures when the main control PWB is exchanged
Ⓐ Check that the power is off. (Replace the PWB.)
Ⓑ Short the test pin (RESET) of the main control PWB to GND.
Ⓒ Turn the power on.
Ⓓ Execute the test command 79 to select the destination.
Ⓔ Execute the test command 25 to perform the automatic developer adjustment.
Ⓕ Execute the test command 27 to measure the AE sensor characteristics.
Ⓖ Execute the test command 46 to adjust the exposure level.
Ⓗ Execute test command s48, 50, 72, 90, 97, and 96 to do settings.
Ⓘ Set values for the total counter, maintenance counter, and developer counter.
Ⓙ Finished

Remove the rear panel. Make a copy. If necessary, remove even the front panel.

If a copy is made without removing the front panel, it may damage some component in the fuser block due to an irregular temperature rise.

[7] ADJUSTMENTS

1. Paper feed block

(1) Paper feed roller angular adjustment

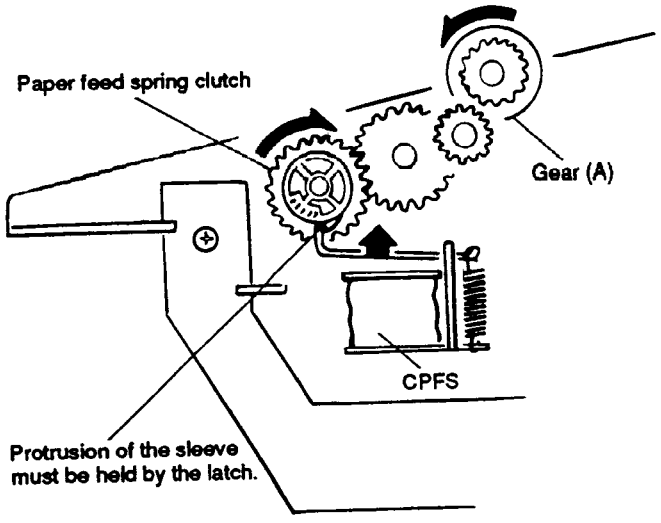
Adjustment is required for any of the following reasons:

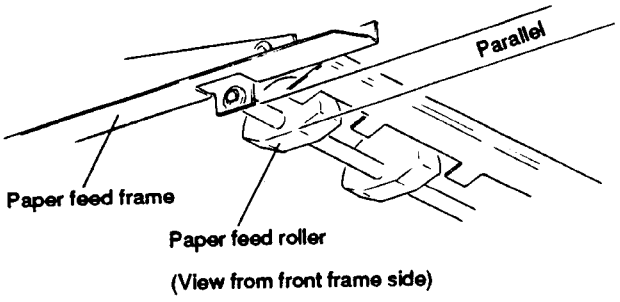
- Misfeed in the paper feed unit
- When component parts are disassembled or replaced.

(Check procedure)

① Remove the paper feed unit from the frame.

② Manually rotate the gear (A) in the arrow direction and stop it when the protrusion on the clutch sleeve comes in contact with the paper feed latch.
At this time make sure that the paper feed roller is parallel to the lower part of the paper feed frame. Allowance is 0±5°.





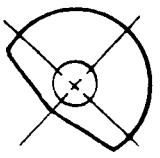
(View from front frame side)

(Adjustment procedure)

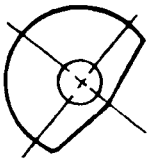
① Check an angular deviation of the paper feed roller.

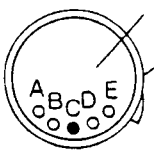
② Change the location of the clutch spring according to the direction of angular deviation.

(View from the rear frame side)

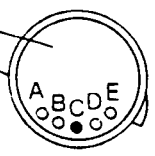


(View from the rear frame side)





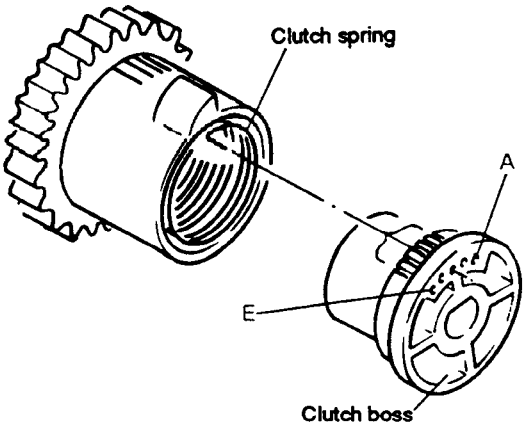
Change the location from the standard hole position C to B or A.



Change the location from the standard hole position C to D or E.

②-a. Remove the spring clutch unit.

②-b. Change the location of the clutch spring relative to the clutch boss.



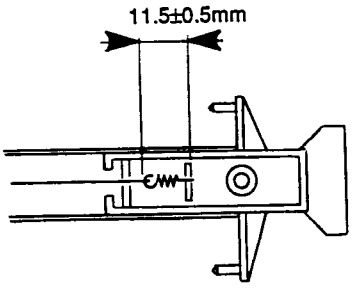
* When the clutch is disassembled, the inside of the clutch spring must be lubed with grease (UKOG-0062FCZZ).

2. High voltage units

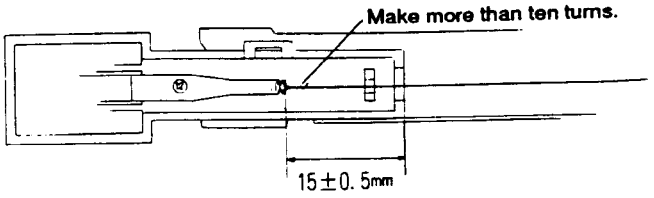
(1) Corona wire replacement

Refer to the figure below for replacement of the corona wire.
(Corona wire must be replaced at every 30000 copies.)

① Main corona unit (MC UN)

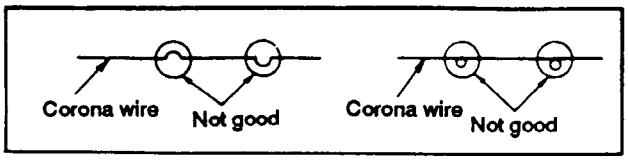


② Transfer corona unit



(Precautions when replacing the corona wires)

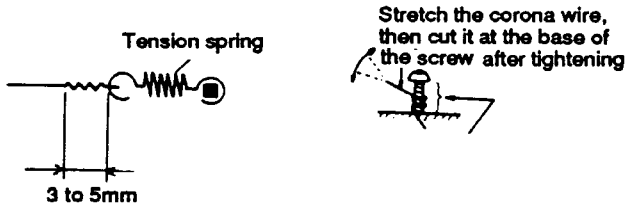
ⓐ The corona wire must not be twisted or kinked.



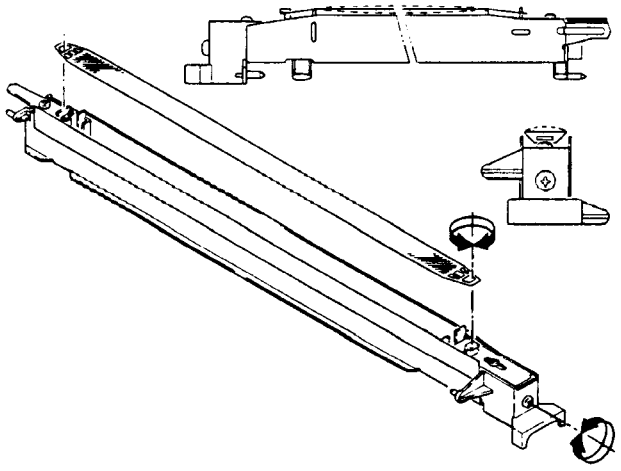
ⓑ Clean the corona wire after replacement with isopropanol alcohol only.

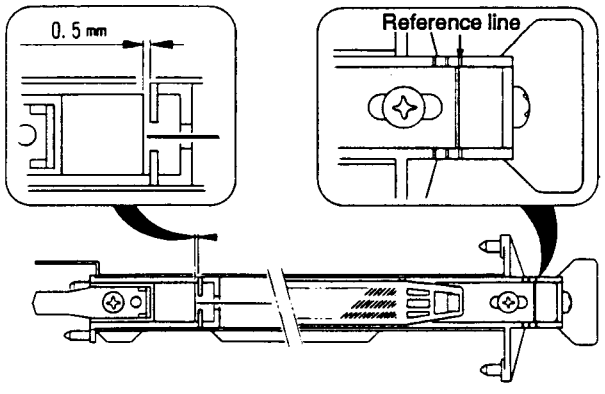
ⓒ Wipe dry after cleaning.

ⓓ Use the 70 micron corona wire (DWIR-0466CSZZ).



2) Stretching the main corona grid



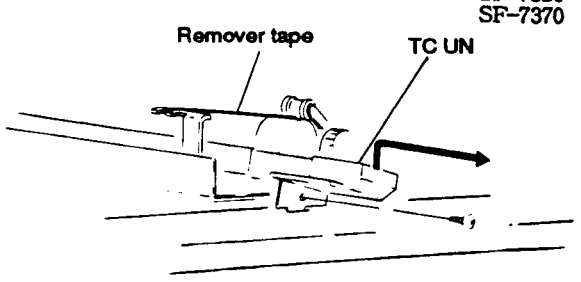


3) Transfer corona removal

① Open the clam shell.

② Remove the screws that hold the transfer corona unit.

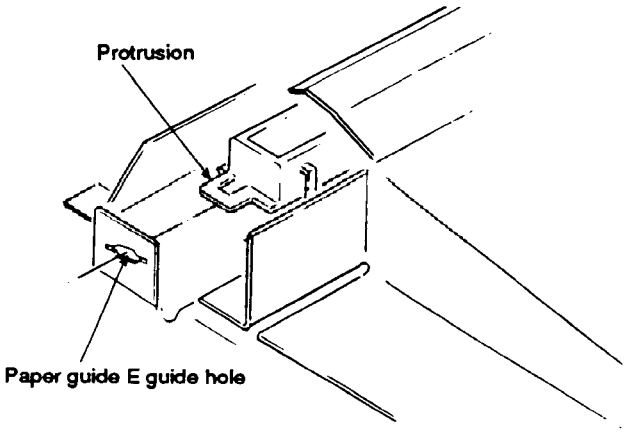
③ Pull out the transfer corona unit from the rear frame side, take care not to damage the remover tape.



Rear frame side

(Precautions when installing the transfer corona unit)

Insert the protrusion on the transfer corona unit into the guide hole of the paper guide E on the front frame side.



Front frame side

(4) High voltage unit output adjustments

• Tools required:

① DCD test sheet (UKOG-0114FCZZ) — Used in SF-7200

② DCD test sheet harness (DHAI-0304FCZZ).

③ Digital multimeter (or micro ammeter).

NOTE: The meter must have a measuring range of 0 to 100μ with a tolerance of ±1%

• The high voltage unit must be adjusted for any one of the following reasons:

① After replacement of the main or transfer high voltage unit.

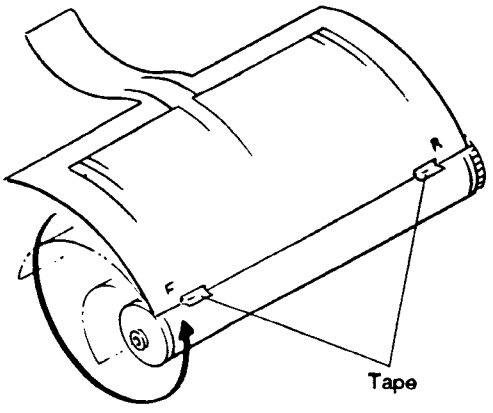
② After replacement of the main or transfer corona unit.

• Corona output measuring procedures:

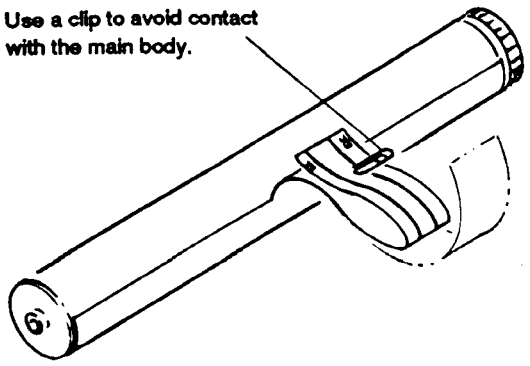
a. Transfer corona current measurement

① Remove the developer unit, drum unit from the copier.

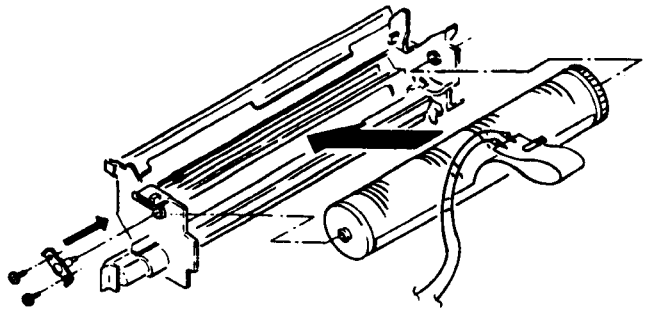
② Install the DCD sheet and secure it on the drum using tape.



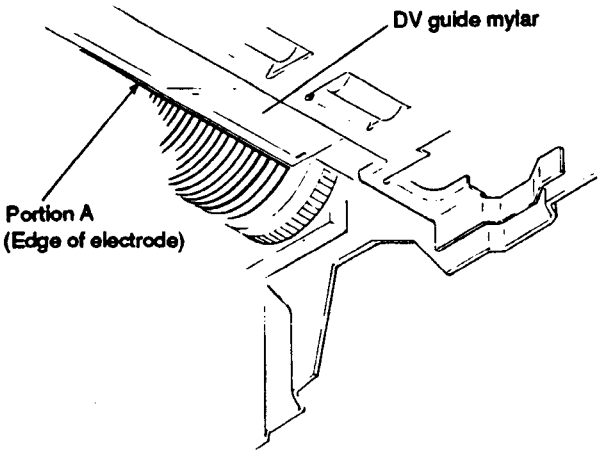
Must be aligned to the front frame side edge.



③ Install the DCD installed drum on the drum unit.
Connect the harness.



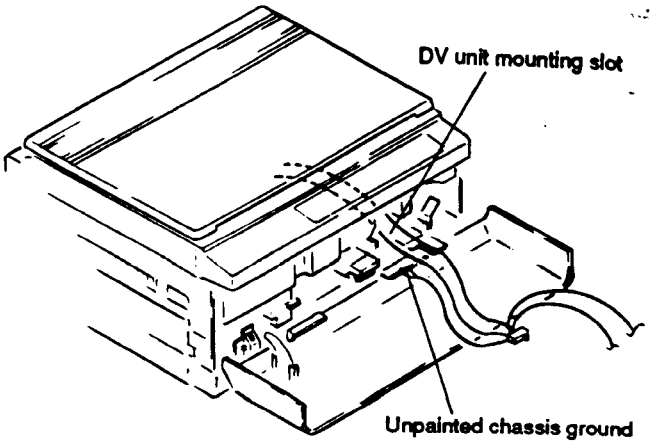
④ Install the drum unit in the copier with the cable extending out of the developer unit insertion slot and that the electrode sheet portion A in alignment with the DV guide mylar sheet.



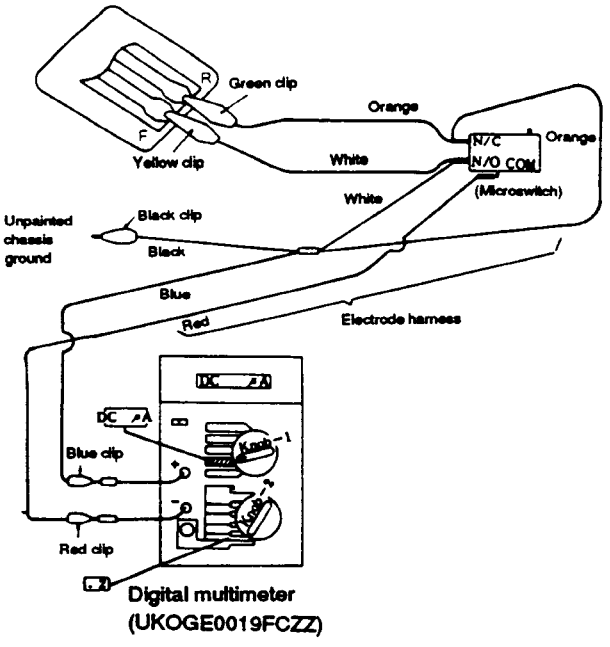
⑤ Clean the transfer corona wire, and install the transfer corona unit in the drum unit.
Do not install the developer unit, at this time.

⑥ Close the clam shell.
Turn on the cabinet switch with the corona cleaner.

⑦ Feed the DCD harness through the developer unit mounting slot, and connect the test leads with the black clip to a good chassis ground.



⑧ Connect the DCD test leads to the meter and the DCD sheet.



IMPORTANT: Make sure that the black test lead is connected to a good chassis ground.

When the digital multimeter is used, connect the test leads as follows:

Red clip to the negative jack of the meter.

Blue clip to the positive jack of the meter.

And set the meter range as follows:

Knob-1 to DCmA range.

Knob-2 to 0.2.

When the ammeter is used, connect the test leads as follows:

Red clip to the negative jack of the ammeter.

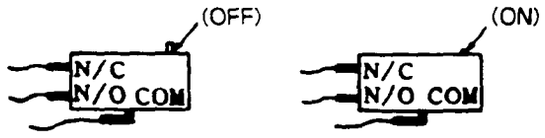
Blue clip to the positive jack of the ammeter.

⑨ Measure the current at the front and rear frame sides. The current difference must be within 2.0μ.

a. Turn the main power on and enter test command "9-1". The main high voltage unit will activate for 30 seconds.

b. Measure the drum current at the front and rear frame sides.

- When the test harness microswitch is off, the front frame side current is indicated on the meter.
- When the test harness microswitch is on, the rear frame side drum current is indicated on the meter.



c. Make sure that a current difference is not greater than 2.0μ. If the current difference is greater than 2.0μ, replace the corona unit.

⑩ Adjust the MHVG output current.

- Turn the main power on and enter test command "9-1". The main high voltage unit will activate for 30 second.
- Adjust the MHVG output adjusting pot located on the high voltage unit so that the MHVG output current should be at 18.0±3μA.

b. Transfer corona output measurement:

① Connect the DCD test leads to the meter.

② Clean the transfer corona wire, and mount the transfer corona unit in the copier. The main corona unit may be mounted during the measurement.

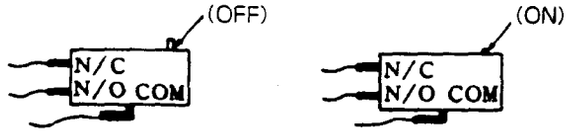
③ Perform the procedure (3)-a-⑦ to ⑨.

④ Measure the current at the front and rear frame sides. The current difference must be within 3.0μ.

a. Turn the main power on and enter test command "9-2". The main high voltage unit will activate for 30 seconds.

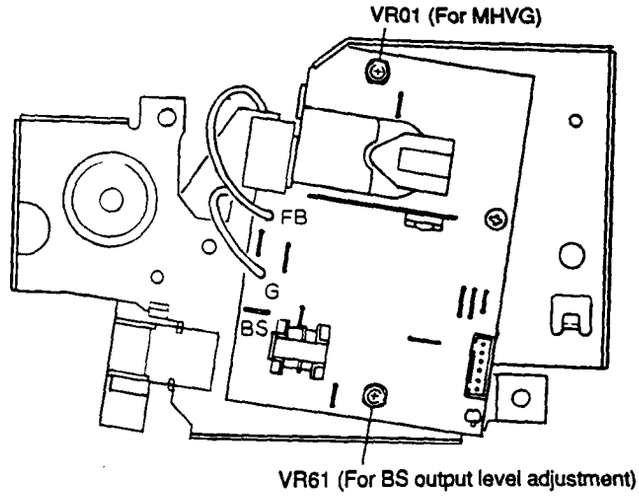
b. Measure the drum current at the front and rear frame sides.

- When the test harness microswitch is off, the front frame side current is indicated on the meter.
- When the test harness microswitch is on, the rear frame side drum current is indicated on the meter.



c. Make sure that a current difference is not greater than 3.0μ. If the current difference is greater than 3.0μ, replace the corona unit.

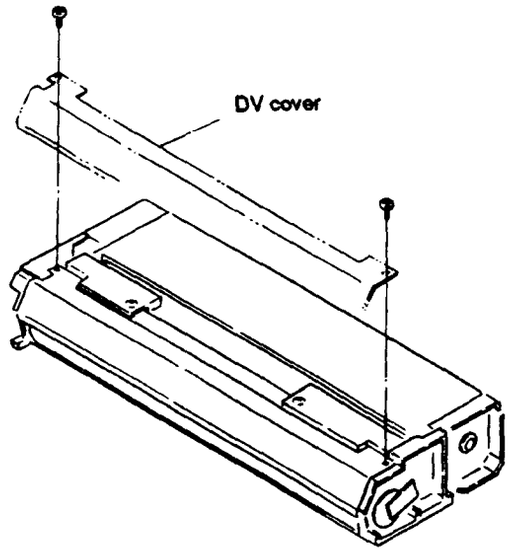
C. Adjusting pot locations



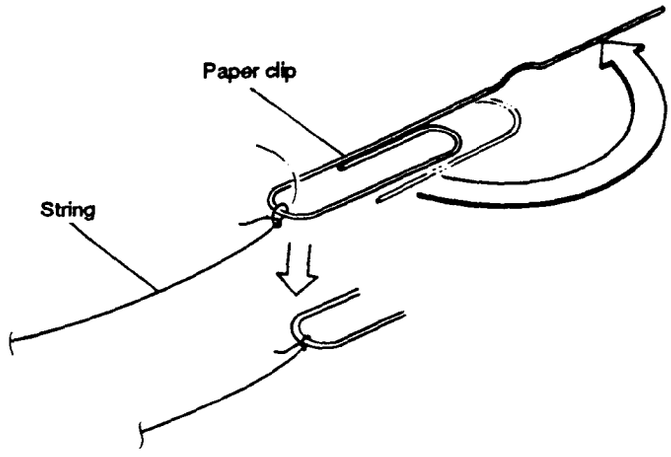
3. Developing unit

(1) MG roller main pole adjustment

① Remove the developer unit from the copier. Remove the DV cover (two screws).

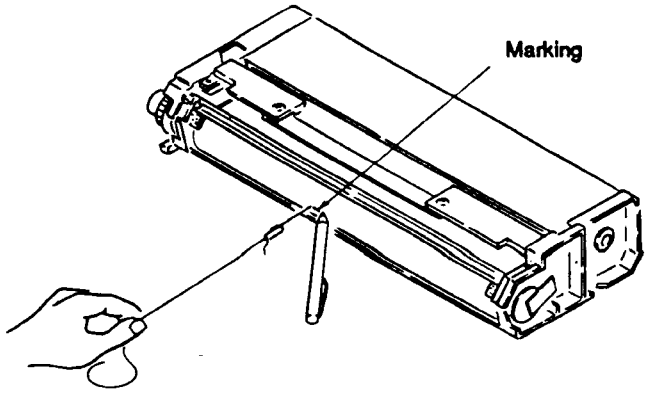


② As illustrated in the figure below, stretch one end of a paper clip and tie the other end with a string.

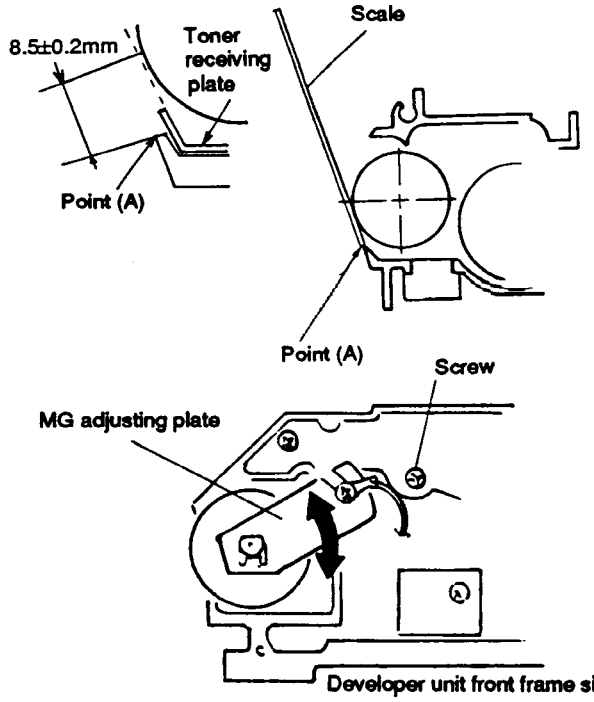


③ Hold the string and bring the paper clip close to the MG roller.

④ Mark the surface of the MG roller sleeve where the clip makes contact with the MG roller.



⑤ Measure the distance between this mark and point (A) on the DV doctor blade. Make sure if the distance is within 8.5±0.2mm.
If not, loosen the MG roller adjusting plate screw and move the MG adjusting plate.
Then, repeat steps ③ to ⑤ again, to check the adjustment.



⑥ Tighten the MG roller adjusting plate screw.

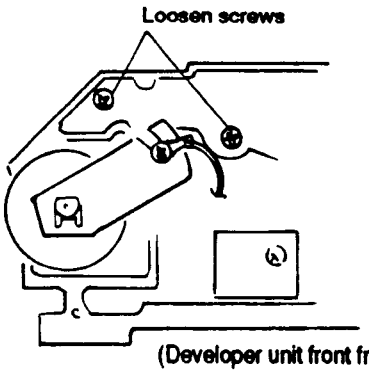
(2) DV doctor blade to MG roller gap adjustment

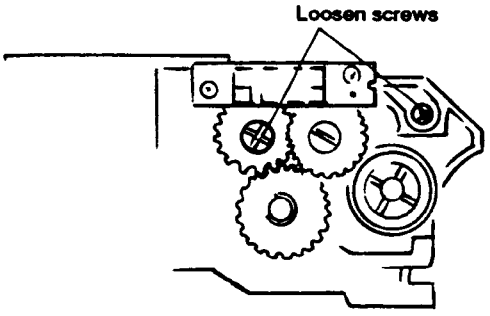
The following problems may occur if the DV doctor blade is adjusted improperly.

- Lack of copy density
- Background on the copy
- Toner dusting

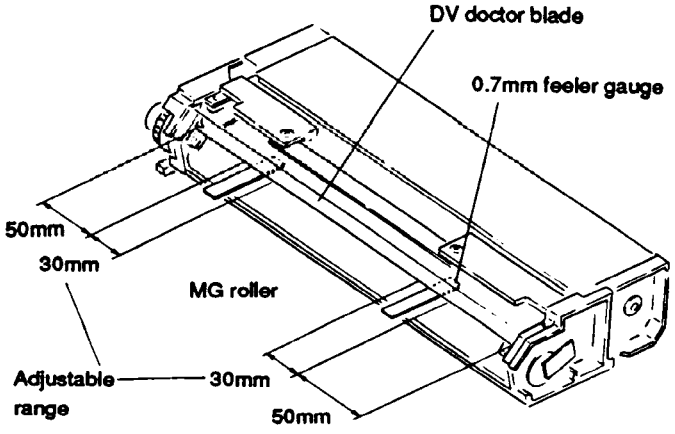
① Remove the DV cover.

② Loosen the DV doctor blade holding screws.



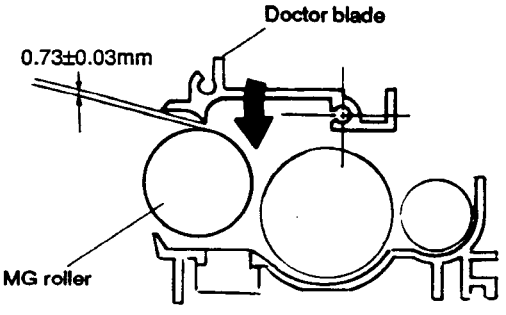


③ Insert the 0.725mm feeler gauge between the MG roller and the DV doctor blade 50 to 80mm in from the edge of the developer tank, as shown.



④ Push the DV doctor blade in the arrow direction and fasten it with the screw.

⑤ At three locations near the center of the developing tank and 50 to 80mm location from its sides, make sure the doctor blade clearance is 0.73±0.03mm.

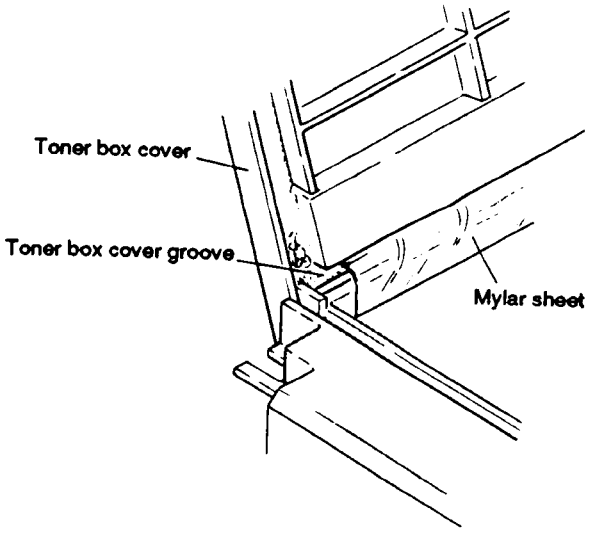


NOTE: Do not scratch the DV doctor blade when adjusting.

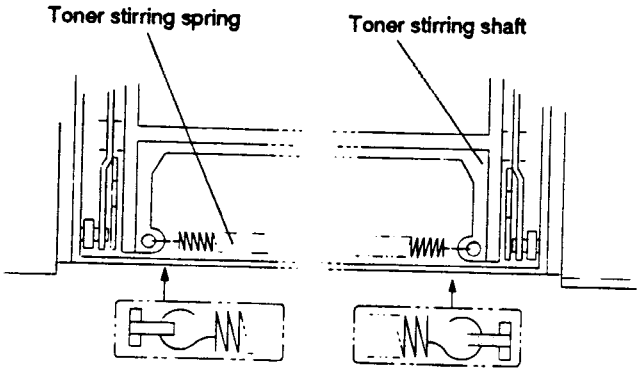
4. Toner box

(1) Hints and tips for re-assembling

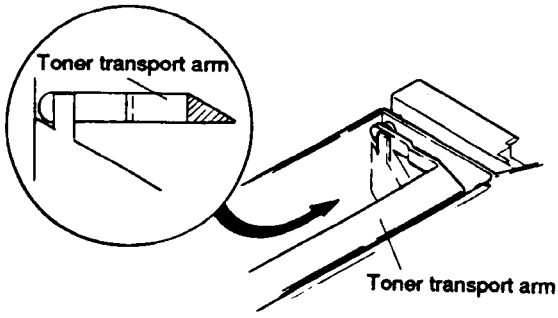
① When installing the toner box cover on the toner box, the mylar sheet must be engaged into the groove.



② The toner stirring spring must be installed from beneath the toner stirring roller.



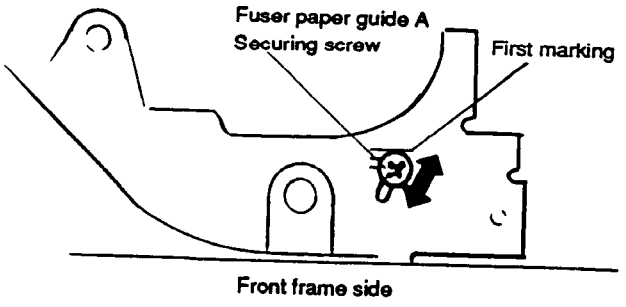
Note the installing direction of the toner transport arm.

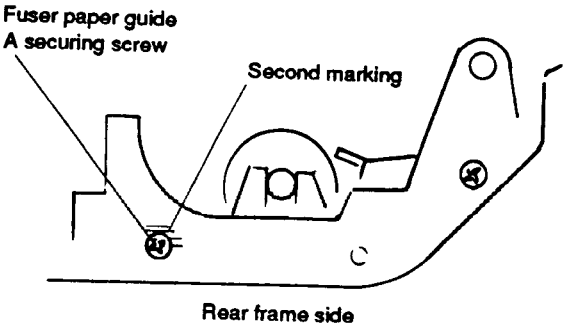


5. Fuser unit

(1) Fuser paper guide A installation location (Basic location)

The top end of the fuser paper guide A securing screw must be on the mark on the fuser baseplate as following picture.
Open the clam shell and lift the upper fuser frame to see the screw.
If wrinkles were to occur, change the location of the fuser paper guide A to adjust.

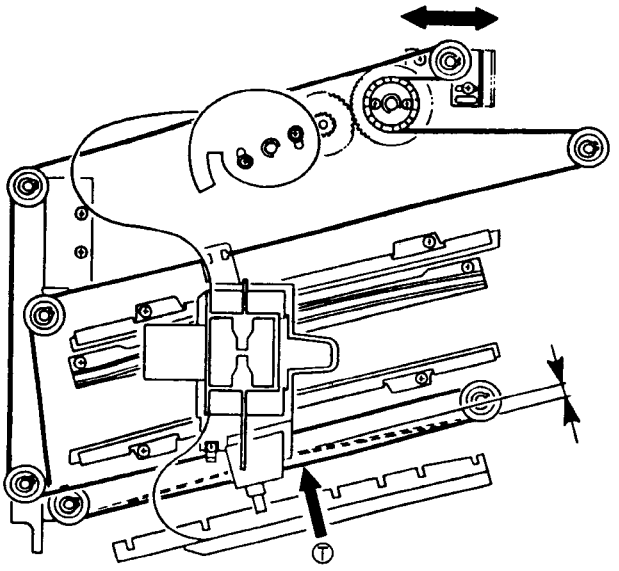




6. Optical system

(1) Wire tension adjustment

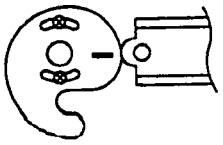
- With the lens carriage unit in the normal position, push the marked portion of Ⓣ the wire (at the center between the lens carriage and the pulley) down with the tension gauge, and move the tension pulley bracket position so that the wire contacts the baseplate with 130±10 grams of tension.



(2) No.4/5 mirror shift cam normal position adjustment

① Move the carriage unit to the normal position and turn power off.

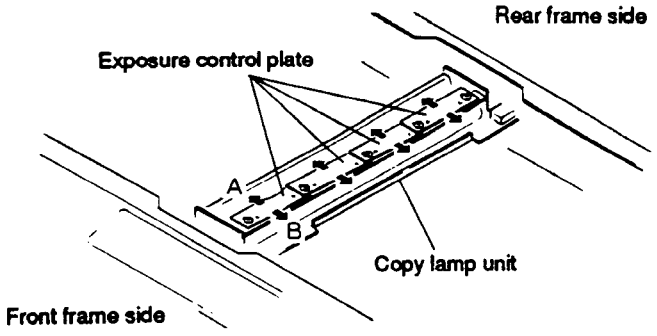
② Fasten the 83T gear and the No.4/5 mirror shift cam fingertight with screws. At the center of an oval hole, insert it into the 83T gear so that the marking on the No.4/5 mirror shift cam may match the center of the counter roller.



③ Make sure that the lens carriage unit is in the normal position. Adjust the location of the No.4/5 mirror shift cam so that the marking on the mirror shift cam may align to the center of the counter roller.

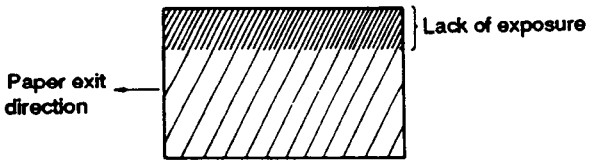
(3) Exposure balance adjustment

Make a half-tone copy on B4 (10" x 14") paper in the normal (1:1) mode, then adjust the exposure balance by moving the exposure control plate in direction A or B.
Direction A makes the exposure darker and direction B makes the exposure lighter.



NOTE: If the exposure control plate was moved, copy density needs to be adjusted.

Example: If the copy is like the one shown below, move exposure control plate in direction B to balance the exposure on the front frame side.



(4) Resolution adjustment (partial)

For this adjustment the optical distance between the document and the drum is adjusted by changing the copy lamp unit location.
Adjustment is required for any of the following reasons:

- After replacement of the mirror base drive wire
- After replacement of the copy lamp unit or No.2/3 mirror base
- When part of the copy is improperly focused.

① Make a copy and check the area where the resolution is improper.

- If resolution is off on the front frame side of the copy, change the location of the copy lamp unit on the rear frame side.
- If resolution is off on the rear frame side of the copy, change the location of the copy lamp unit on the front frame side.

② Remove the table glass

③ Loosen the drive wire bracket screw and change the location of the copy lamp unit, 1mm at a time.

④ Fasten the drive wire bracket screw and secure the copy lamp unit.

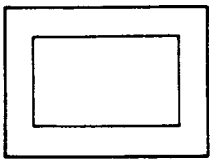
⑤ Replace the table glass and check the resolution.

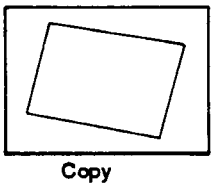
⑥ If the resolution is not satisfactory, repeat above steps 1) thru 5).

(5) Vertical skew adjustment

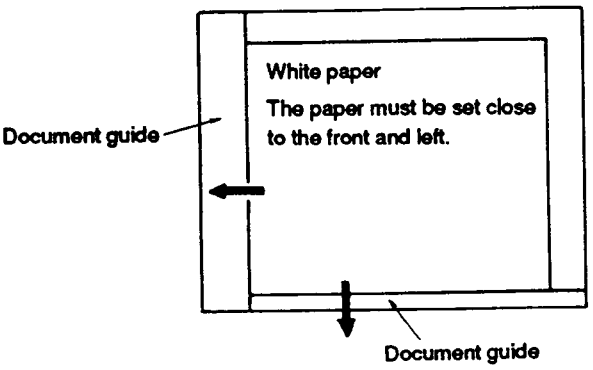
This adjustment is required for any of the following reasons:

- After replacement of mirror base drive wire.
- After replacement of the copy lamp unit or No.2/3 mirror base.
- When a copy like the one shown below is produced.



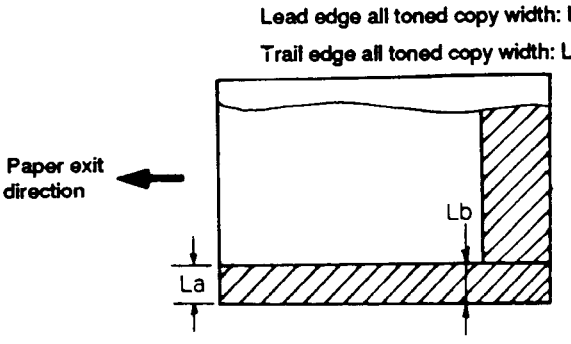


① Use a sheet of A4 or 11" x 8-1/2" paper for an original and align it with to the document guide.



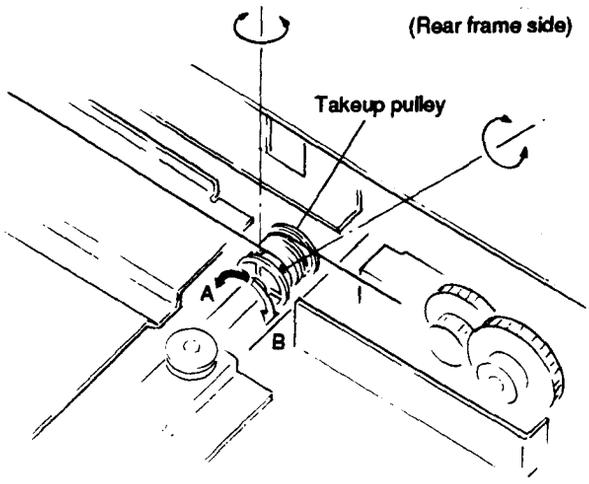
② Make a copy on the B4 or 10" x 14" paper in the normal (x1.0) mode with the original cover open.

③ Measure the width of the toned area at the lead edge and trail edge of the copy.



If the width of the lead edge toned area (La) is identical to the trail edge toned area (Lb), no adjustment is required.
If (La) is not identical to (Lb) then perform steps ④ thru ⑦.

④ Loosen the rear frame side take up pulley holding setscrew.
If La is greater than Lb, rotate the rear frame side takeup pulley in direction B without moving the takeup pulley shaft.
If La is not greater than Lb, rotate the rear frame side takeup pulley in direction A.



⑤ Tighten the setscrew of the takeup pulley and secure the takeup pulley on the takeup pulley shaft.

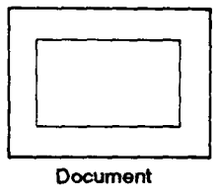
⑥ Repeat steps ① thru ③.

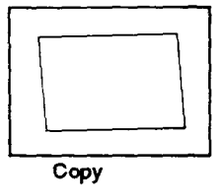
⑦ If La is not equal to Lb, repeat steps ④ and ⑤.
Adjustment is complete if La equals Lb.
Repeat steps ① thru ⑥ until La equals Lb.

(6) Horizontal skew adjustment

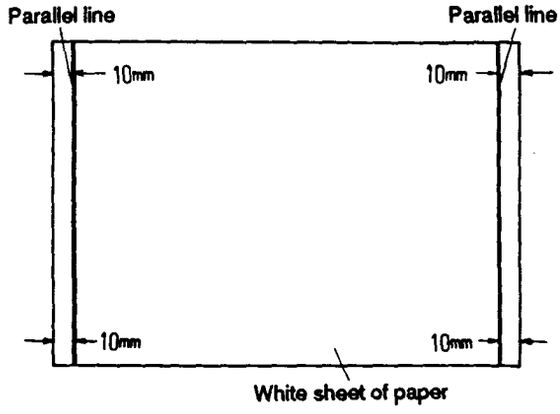
Horizontal skew is adjusted by varying the height of the front frame side of the No.2/3 mirror base rail.
Adjustment is required for any of the following reasons:

- After replacement of the mirror base drive wire.
- After replacement of the copy lamp unit or the No.2/3 mirror base.
- After replacement of the No.2/3 mirror base rail or its position.
- When a copy like the one shown below is produced.

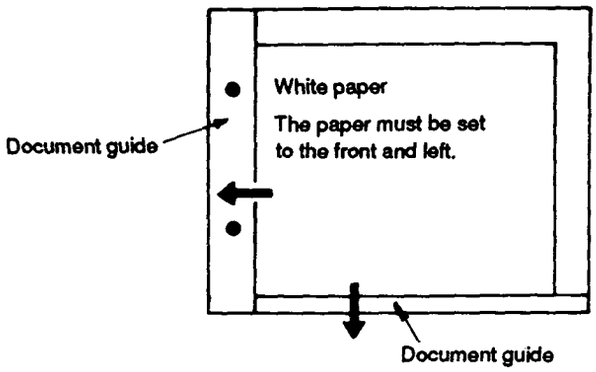

Document


Copy

① Prepare a document for adjustment.
Prepare a sheet of B4 (10" x 14") paper for a document and draw a parallel line 10mm from the lead edge and trail edge.
This has to be exact.

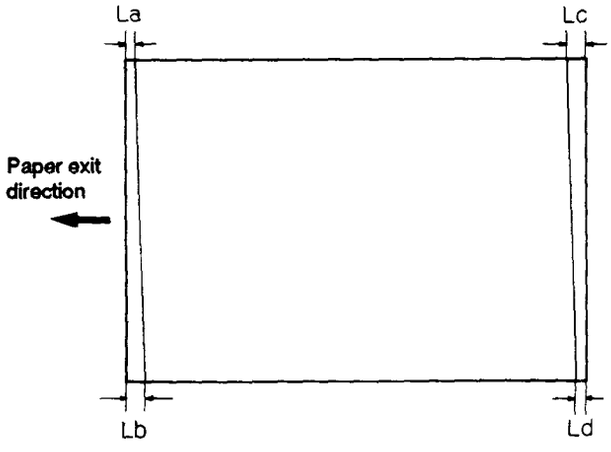


② Place the document on the document table.



③ Make a copy in the normal mode.

④ Measure the distance at La and Lb, and Lc and Ld.



If La equals Lb and Lc equals Ld, there is no need to adjust the mirror base.

⑤ Move the No.2 mirror base rail location up or down to adjust.

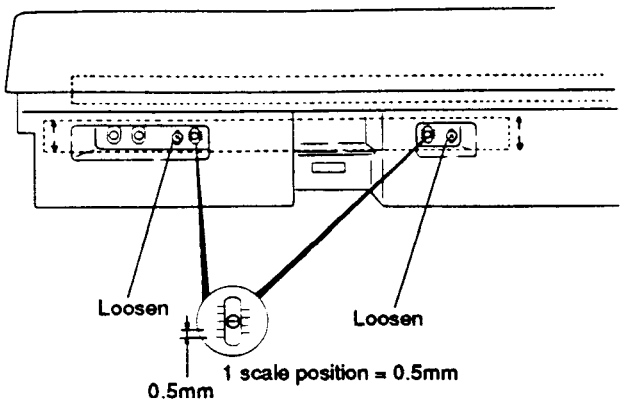
If La is greater than Lb:
Shift the paper exit side No.2 mirror base rail up half the distance between La and Lb.

If La is not greater than Lb:
Shift the paper exit side No.2 mirror base rail down half the distance between La and Lb.

(Example):
If La is 12mm and Lb 9mm, shift the paper exit side No.2 mirror base rail 1.5mm up.
(La — Lb) / 2 = (12 - 9)/2 = 1.5

If Lc is greater than Ld:
Shift the paper entry side No.2 mirror base rail up half the distance between Lc and Ld.

If Lc is not greater than Ld:
Shift the paper entry side No.2 mirror base rail down half the distance between Lc and Ld.
If La ≠Lb and Lc ≠Ld then proceed to next step.



⑥ Repeat steps| ② and ③.

⑦ If La is not equal to Lb and Lc to Ld, repeat steps ② thru ⑤, until La becomes equal to Lb and Lc to Ld.

⑧ Manually rotate the mirror base drive pulley to insure that the mirror bases do not contact each other.

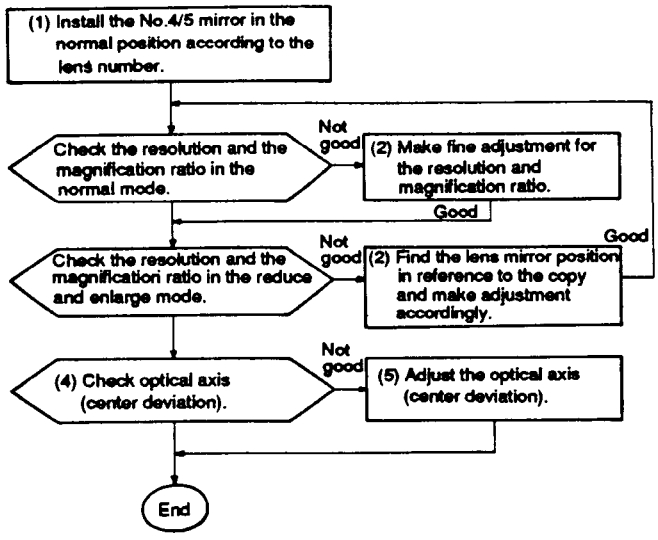
NOTE: Move the mirror base rail carefully to prevent possible damage to the mirror bases.

(7) Lens base unit adjustments

Adjustment is required for any of the following reasons:

- After replacement or removal of a lens base unit component.
- When the proper resolution is not produced over the entire copy area.
- When a magnification error is encountered.
- When center deviation is incorrect.

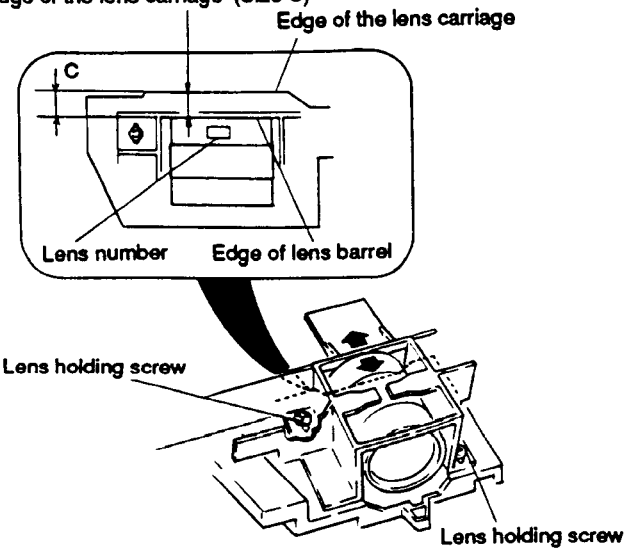
Adjustment procedure


(1) Install the No.4/5 mirror in the normal position according to the lens number.
Check the resolution and the magnification ratio in the normal mode.
Not good
(2) Make fine adjustment for the resolution and magnification ratio.
Good
Check the resolution and the magnification ratio in the reduce and enlarge mode.
Not good
(2) Find the lens mirror position in reference to the copy and make adjustment accordingly.
Good
(4) Check optical axis (center deviation).
Not good
(5) Adjust the optical axis (center deviation).
End

Flow chart description
(1) Lens, No.4/5 mirror normal mode locations (SF-7370)
(A). Position of the lens in the normal mode is as follows.
a) Between the lens carriage and lens
b) Between the lens carriage and the baseplate

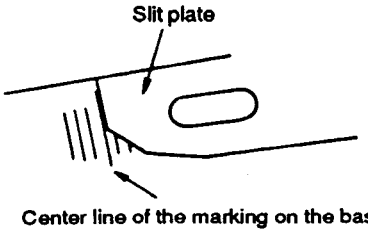
a) Between the lens carriage and the lens
Install in the following location according to the lens number.

Distance between the edge of the lens barrel and the edge of the lens carriage (Size C)



Lens number	Size C (mm)
17.0	12.5
16.5	12.25
〃	〃
11.0	9.5
10.5	9.25
10	9
9.5	8.75
9.0	8.5
〃	〃
3.5	5.75
3.0	5.5

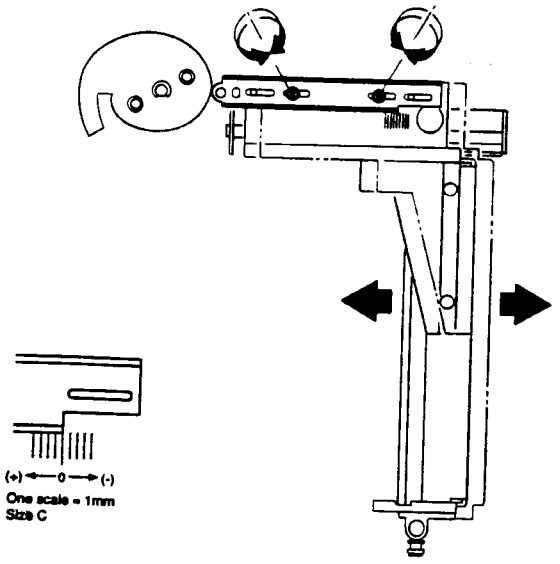
b) Between the lens carriage and the baseplate
The normal (x1.0) position of the lens carriage is dependent to the slit plate.
For any lens number, the marking on the baseplate must match the center line of the slit plate when the slit plate is initially installed.



Make an actual copy and check the magnification ratio.
If not satisfactory, shift the slit plate to adjust.
One scale position changes the magnification ratio 0.5%.

(B). No.4/5 mirror normal (x1.0) position
The position of the No/4/5 mirror in the normal (x1.0) mode must be adjusted by the position of the bearing holding plate and the bearing connection plate (fine adjustment).

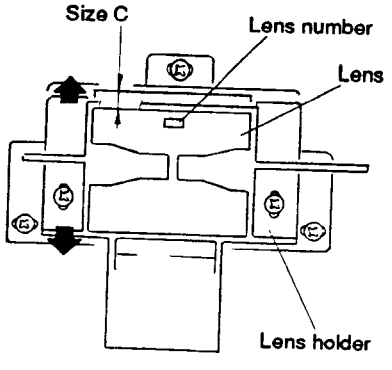
SF-7370 optical system



Lens number	Size C (mm) SF-7370
17.0	+3.5
16.5	+3.25
↕	↕
11.0	+0.5
10.5	+0.25
10	0
9.5	-0.25
9.0	-0.5
↕	↕
3.5	-3.25
3.0	-3.5

ns and No.4/5 mirror normal (x1.0) mode location
-7320)

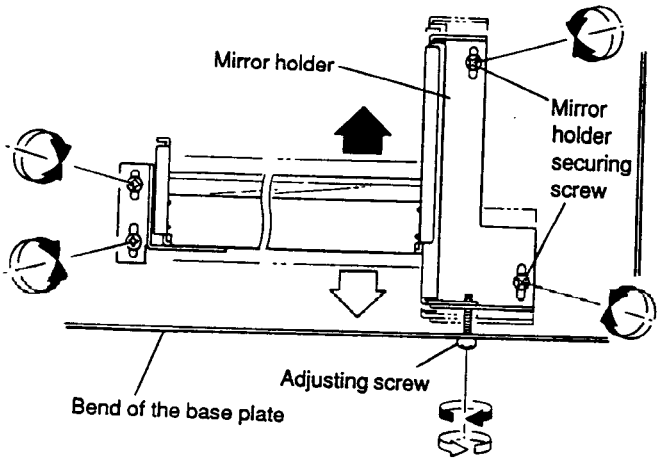
: Lens
Adjust the distance between the lens and the lens holder according to the lens number. (Size C)



Size C (SF-7300)

Lens number	Size C (mm)
17.0	10.5
↑	↑
11	7.5
10.5	7.25
10	7
9.5	6.75
9.0	6.5
↓	↓
3.0	3.5

(B). No.4/5 mirror
Adjustment must be done by the distance between the bend of the baseplate and the mirror holder according to the lens number (Size D).



Size D (SF-7320)

Lens number	SF-7320
17.0	5.0
16.5	5.25
↕	↕
11.0	8.0
10.5	8.25
10	8.5
9.5	8.75
9.0	9.0
↕	↕
3.5	11.75
3.0	12

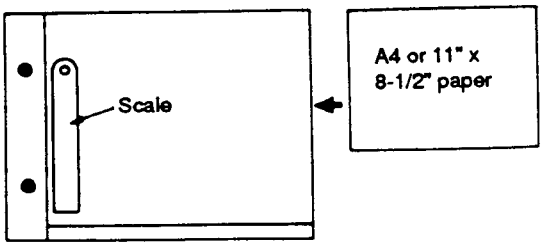
(2) Resolution and magnification ratio fine adjustment (SF-7370)

(A) Resolution
Fine adjust the locations of the bearing holding plate and the bearing connection plate, then adjustment resolution.

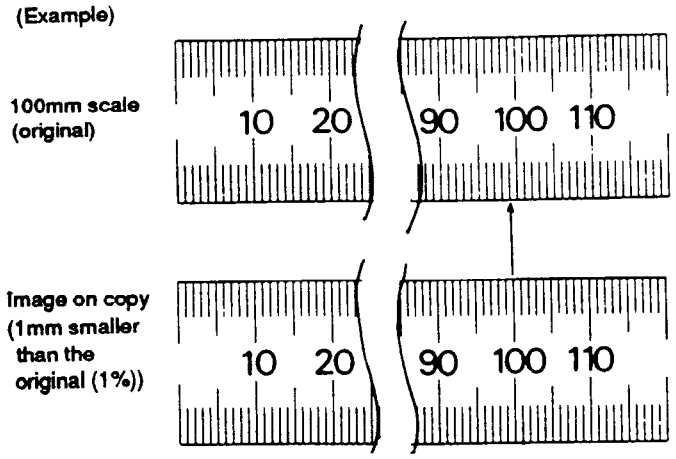
(B) Magnification ratio
Use test command 48.
(SF-7370 only)
Used to adjust the magnification ratio in the longitudinal direction of the copy.
By changing the lens home position in the normal mode, the magnification ratio in the longitudinal direction of the copy (across the front and rear frame sides) can be adjusted.

Method:

① Place a scale across both frame sides of the original table and make a copy in the normal mode to obtain the magnification ratio compensation value.
Magnification ratio = (original size – copy image size) / (original size) x 100



(Example)



Longitudinal copy magnification ratio =
100 - 99 / 100 x 100 = 1 [%]

② Execute test command 48.
C → 0/◊ → 0/◊ → C → 4 → 8 → PSW
As the ready lamp turns on, the previously stored figure (2 to 9) is displayed. Find the magnification ratio and compensation value in the table.
(Input figure) = (previously stored figure) + (compensation factor)
When the PSW is pressed after entry of a new figure, the figure is stored in the memory and the ready lamp goes out.
Since it is not possible to adjust the magnification ratio with this test command for a figure less than 2 or greater than 9, the lens base slit plate needs to be moved towards the paper entry side if smaller than 2 or towards the paper exit side if greater than 9 before making adjustment.

Example

Magnification ratio	Compensation factor	Previously stored value	Input value
+0.5	+5	2	7
–0.25	–2	6	4
–0.5	–5	3	(Movew to the lens base slit paper entry side)

③ Make a copy in the normal mode and compare the size of the scale image on the copy with the actual scale.
Push the CLEAR key to cancel test command.

④ If the size of the scale image on the copy equals the actual scale size, the adjustment has been complete.
If not, repeat steps 1) thru 3) until successful adjustment is attained.

⑤ Cancel test command 48 by pushing the CLEAR key twice.

Resolution and magnification ratio fine adjustment (SF-7320)

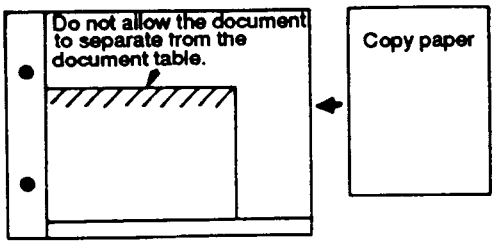
(A) Resolution
Loosen the No.4/5 mirror holder holding screws.
Adjust the No.4/5 adjusting screw in according to the resolution on the copy.

(B) Magnification ratio
Adjustment is not required because the magnification ratio should be within limits when the resolution is correct.

(3) Enlargement and reduction mode focus and magnification ratio adjustments
If the focus and magnification ratio are within the limits, the focus and magnification ratio will also be within the limits in the enlarge and reduce modes.

(4) Optical Axis (center deviation) check-out procedure

① Place a white sheet of B5 (8-1/2" x 5-1/2") on the document table as shown below. (landscape)

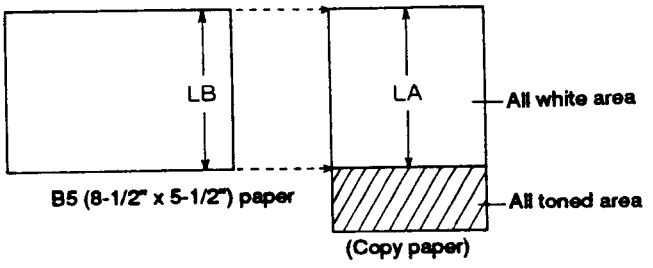


② Insert an B5 (8-1/2" x 5-1/2") copy paper in the machine. (portrait)

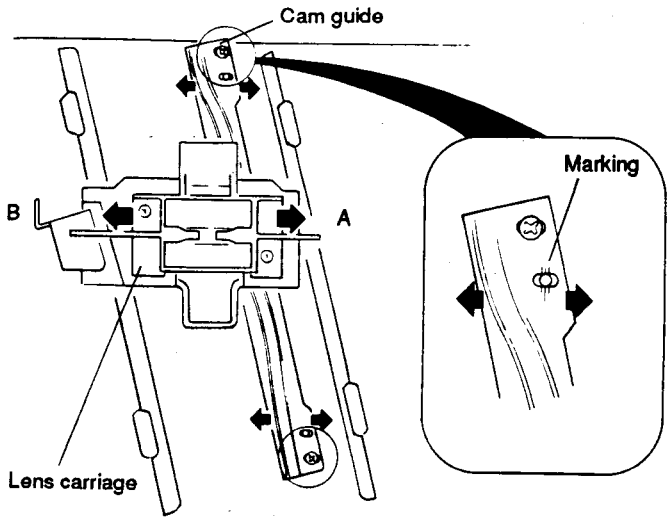
③ Make a copy in the normal mode with the original cover open.

NOTE: Do not allow the hatched portion of the document to lift from the table surface.

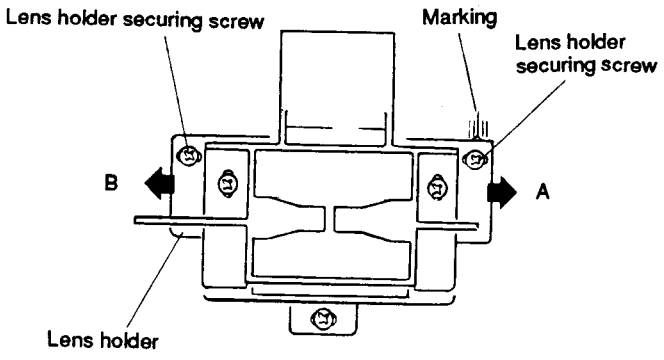
④ Compare the length LB with the length LA of the copy paper.



(5) Optical axis (center deviation) adjustment
(SF-7370)
Adjustment must be done by means of the cam guide.
Make the adjustment by referring to the center of the protrusion on the baseplate with the marking on the cam guide.
One scale position will vary the optical axis 2mm in the normal mode (x1.0).
Adjustment is not required if LA - LB is smaller than 2.0mm.
Shift the lens carriage towards the rear frame side (direction A), if LA - LB is greater than 2.0mm.
Shift the lens carriage towards the front frame side (direction B), if LA - LB is smaller than 2.0mm.



(SF-7320)
Adjust the location of the lens holder.



7. Exposure adjustments

(1) AE sensor level adjustment and measurement

① Place four to five sheets of white paper on the original table.

② Execute test command 47.
C → 0/◊ → 0/◊ → C → 4 → 7 → PSW
The mirror base starts to scan and stops at the AE sensor measuring position and the ready lamp (RPL) comes active.
In the copy number window is displayed the AE sensor output value in a hexadecimal number.

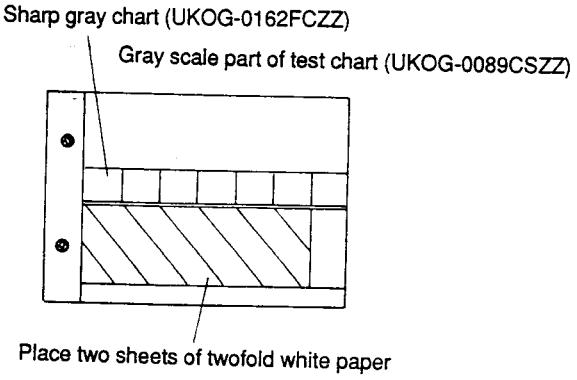
③ After the ready lamp has turned on, press the print switch.
The copy lamp turns on and the AE sensor input value is displayed.

④ Adjust the AE sensor adjusting pot on the main PWB.
After the copy lamp has turned on, adjust the pot so that the input value in the display window may be E0H thru F0H. Turning the pot clockwise increases the value and vice versa. The cassette lamp will come active when the input value is set to the limits of E0H thru F0H.
After the pot has been adjusted, press the print switch to move to the AE sensor output characteristics measuring mode. Unless the print switch is pressed in ten minutes after the copy lamp turned on, it will automatically change to the AE sensor output characteristics measuring mode. In the AE sensor output characteristics measuring mode, the copy lamp drive voltage automatically shifts, and the output characteristics is automatically measured and stored in the memory.
If the AE sensor adjusting pot was not finished within ten seconds, press the print switch after the ready lamp has turned on to continue adjustment.

⑤ Terminate the test command 47.
Press the clear key twice.

(2) Placing the test chart

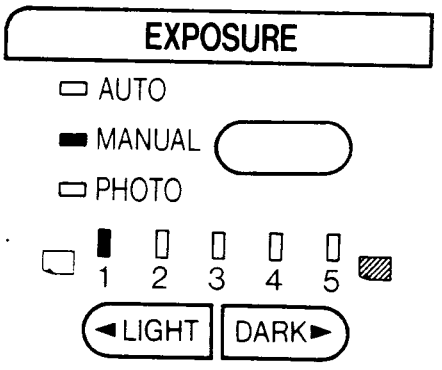
Place four sheets of Sharp specified 120mm wide, 360mm long white paper on the original table in alignment to the front frame side original alignment markings, then place the test chart, Sharp gray chart (UKOG-0162FCZZ) or gray scale part of test chart (UKOG-0089CSZZ) over the stack of paper already placed.



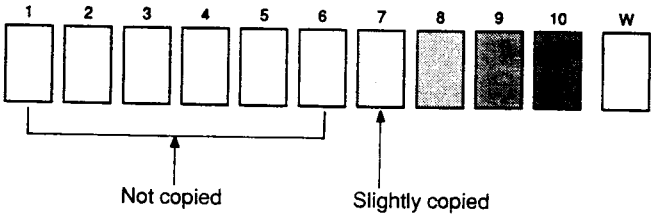
(3) Copy density adjustment

A. Checking copy obtained in the manual density control mode

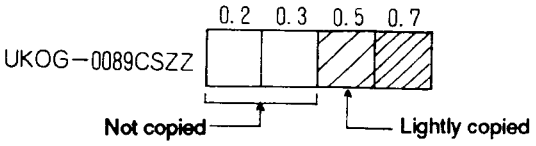
① Execute test command 46.
C → 0/◊ → 0/◊ → C → 4 → 6 → PSW
The exposure in the manual copy mode will come displayed in the operation panel exposure window.



② Make a copy in the normal (x1.0) mode.
Make sure in the manual mode exposure 1.0 that the stripe 7 of the gray chart has a background and the stripe 8 is lightly copied.



Basic copy density (Manual exposure 1.0)

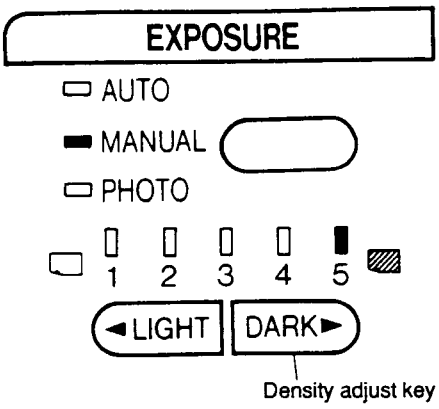


If the copy was lighter, decrease the figure using the copy number setting key.

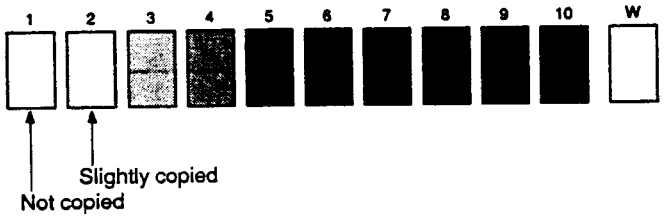
If the copy was darker, increase the figure. The figure can be set within a range of 0 to 90.

NOTE: Do not press the clear key while the test command 46 is being executed. During entry of a number, do not press the clear key to clear the entry but continue to enter figure.

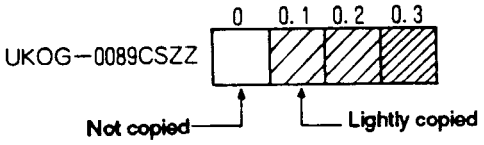
③ Make a copy.
If the copy density is within the limits, press the density adjusting key, then set it to 5.0.



④ Make a copy.
Make sure in the manual mode exposure 5.0 that the stripe 1 of the gray chart has a background and the stripe 2 is lightly copied.



Basic copy density (manual exposure at 5.0 (dark))



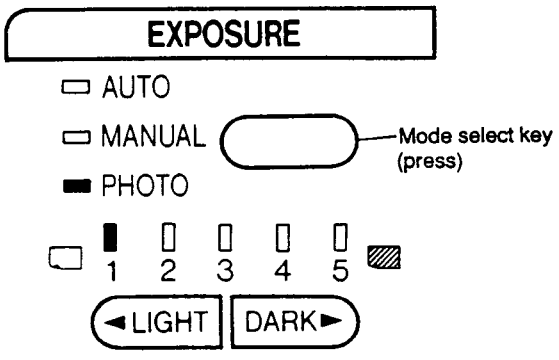
If darker or lighter, do the adjustment as in the exposure 1.0.

B. Check copy in the photo mode.

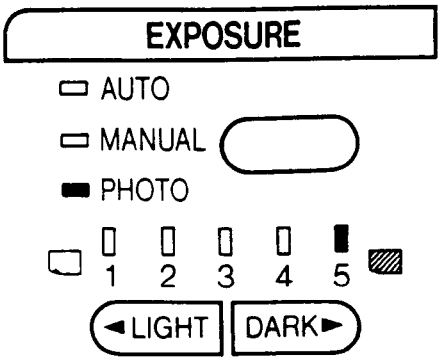
① Change to the photo mode using the mode select key.

② Follow the direction in the exposure 1.0 and 5.0 of the manual copy mode.
The following will be displayed in the operation panel.

Exposure 5.0

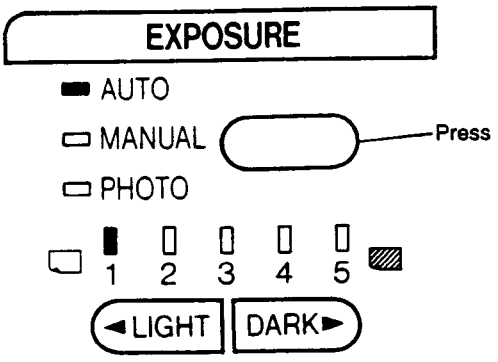


Exposure 1.0



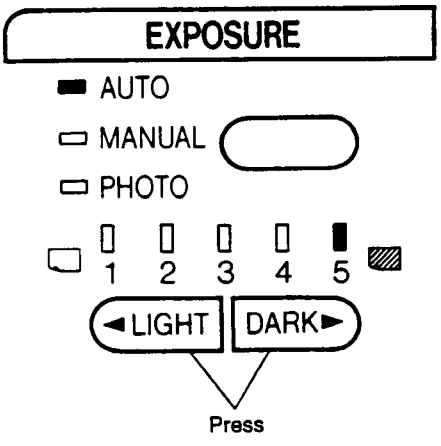
C. Check copy in the auto density mode.

① Change to the auto mode using the mode select key.
The auto mode exposure 1.0 will be displayed in the operation panel exposure display window.

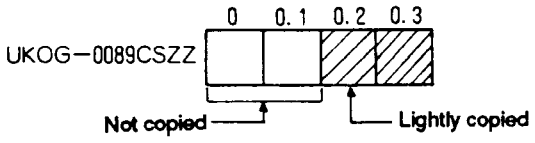


② Make sure that "0" is displayed in the copy number display window. If not, set it to "0".

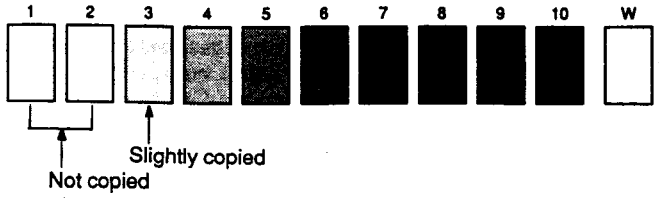
③ Press the function key.
Exposure 5.0 will be displayed in the operation panel exposure window.



Basic copy density (auto exposure)



④ Make a copy.
Make sure in the auto mode that the stripe 2 of the gray scale is not copied but the stripe 3 has a slight background.



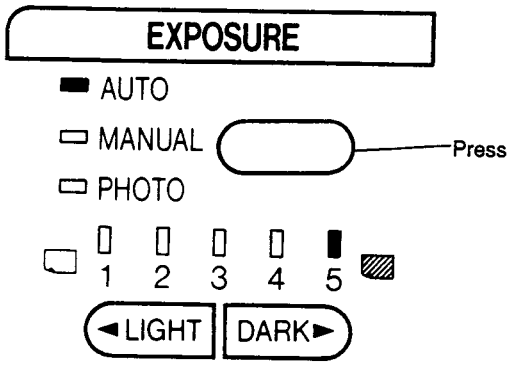
If darker or lighter, do the adjustment the same way as in the exposure 5.0 of the manual copy mode.

⑤ Cancel test command 46 (press the clear key).

D. Check copy in the CPC mode.

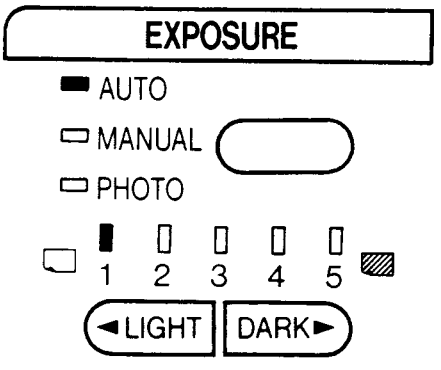
① Change to the CPC mode using the mode select key.
The CPC mode exposure 5.0 will be displayed in the operation panel exposure display window.

Exposure 5.0



② Do the adjustment in the same way as in the auto mode exposure 5.0.
Make sure that "0" is displayed for the exposure 1.0.
If not, set it to "0".

Exposure 1.0



③ Cancel test command 46 (press the clear key).

[8] MAINTENANCE

The SF-7320/SF-7370 requires specific maintenance every 30,000 copies.
The following is a list of basic maintenance items.

▲ = Replace/Install × = Inspect (Clean/Adjust/Replace as necessary)
○ = Clean ★ = Lubricate Δ = Adjust

Item/Section	Parts description	Required Frequency						Remarks	
		Set up	30K	60K	90K	120K	Every call	Drum kit	Heat roller
1. Developer section	Developer, black	▲	▲	▲	▲	▲			
	Side seal F (PSEL-0242FCZZ)		×	×	×	▲	×		
	Side seal R (PSEL-0243FCZZ)		×	×	×	▲	×		
	DV plate (UCLEZ0079FCZZ)		×	×	×	▲	×		
	Drive gears		★	★	★	★			
2. OPC Drum Section	OPC drum		▲	▲	▲	▲		1	
	Cleaning blade (UCLEZ0080FCZZ)		▲	▲	▲	▲	×	1	
	Side lamp		○	○	○	○			
	Discharge lamp		○	○	○	○			
	Corona wire (MC)(DWIR-0466CSZZ)		▲	▲	▲	▲	×		
	Corona housing (MC)		○	○	○	○			
	Screen grid		○	▲	○	▲			
	Toner receive seal assy (CSPA-0021FCZZ)		×	×	×	×			
3. Separator/Transfer Section	Separation tape (PTPE-0134FCZZ)		▲	▲	▲	▲	×	1	
	Separation roller		○	○	○	○	○		
	Tension roller		○	○	○	○	○		
	Corona wire (TC)(DWIR-0466CSZZ)		▲	▲	▲	▲	×		
	Corona housing (TC)		○	○	○	○			
4. Fuser Section	Upper heat roller		○	▲	○	▲	×		1
	Upper heat roller bearing			▲		▲	×		
	Lower heat roller		○	▲	○	▲	×		1
	Upper separator pawls (x 3)(CTME-0186FC01)		○	▲	○	▲	○		3
	Thermistor		○	○	○	○	○		
	Scraper (x 3)(LPLTM2865FCZZ)		×	×	×	×	×		
	Lower cleaning roller (CROLN0647FC01)		×	▲	★	▲			1
	Drive gears		★	★	★	★			
5. Paper Feed Section	Paper feed roller		○	○	○	×	○		
	Resist roller, upper and lower		○	○	○	○	○		
	Transport roller, upper and lower		○	○	○	○	○		
	Spring clutch (paper feed roller and resist roller)		★	★	★	★			
	Drive gears		★	★	★	★			
6. Optical Section	Copy lamp harness (DHAI-1406FCZZ)					▲			
	Mirrors/Lens/Reflector		○	○	○	○	○		
	Mirror position sensor (MHPS, MORS)		○	○	○	○			
	Mirror base drive wire (PWIR-0111FCZZ)/pulley (NPLYZ0127FCZZ)		×	×	×	×			
	Mirror base rail and mirror base holder		★	★	★	★			
	AE sensor		○	○	○	○			
SF-7370 only	Lens position sensor		○	○	○	○			
SF-7370 only	Lens drive wire (PWIR-0112FCZZ)/pulley (NPLYZ0153FCZZ)		×	×	×	×			
SF-7370 only	Lens drive gear		×	×	×	×			
7. Copy Quality		×	Δ	Δ	Δ	Δ	×		
8. Others	Ozone filter (PFILZ0118FCZZ)				▲				
	Waste toner collect bottle	▲	▲	▲	▲	▲	×		
	Gears and bearings		★	★	★	★			
	Timing belt (belt A)(NBLTH0086FCZZ)		×	×	×	×			
	Table glass/document cover	○	○	○	○	○	○		

[9] SELF-DIAGNOSIS AND TEST FUNCTIONS

1. Test command functions

Test functions are used to clarify and pinpoint malfunctions in accordance with the status codes and to manipulate operations in the machine by entering an appropriate test command. The status code can be checked, changed, or canceled by the test command function. In addition, various check-out functions may be performed.

(1) Actuation of the test command functions

① Depress CLEAR, ZERO, ZERO, and CLEAR keys. All of the indicators (except copy ratio indicator, automatic exposure copy density indicator) on the operation panel will go out, and the machine will be ready to accept test commands.

If you do not complete the entering of CLEAR, ZERO, ZERO, CLEAR keys with in 5 seconds, the copier will not go into the test mode. You will have to perform the command entry again.

If a key entry was made while the machine is running or copying, the message in the multiple copy number display window goes out to indicate that the machine is ready to accept a test command.

If it was done while the machine is running, it goes into the test command mode after the drum cleaning cycle has been completed.

If done while the machine is copying, the test command mode is established after the copy operation has been completed.

② Program the test command by entering the two-digit command code. Although any number of digits can be entered through the keyboard, only the last two digits are effective.

③ The test command is executed by pressing the PSW.

④ To change the command, press the CLEAR key. The test program under execution is terminates and all of the front panel indicators will go out. The control returns to Step (2) and is ready for a new entry.

⑤ To terminate the test mode, press the clear key twice for all test commands except the following.
The copier will return to the operational mode.

NOTE:

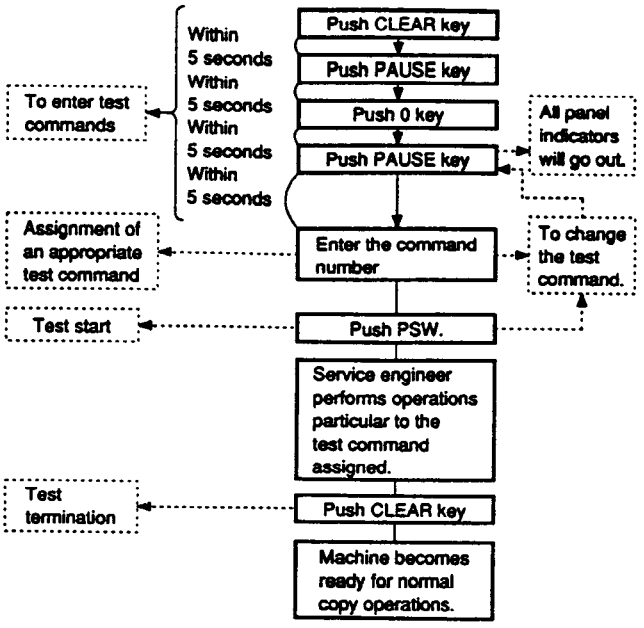
Ⓐ Test programs, 21, 22, 23 or 24.

1. Power switch off, except for the case that the power is turned off with a misfeed existing in the test command mode 21, 22, 23 or 24, toner in empty condition, waste toner bottle fully contained, and with the status P blinking.
2. Press CLEAR, ZERO, ZERO, CLEAR, CLEAR CLEAR keys.

Ⓑ Test commands 13 and 14.
As the test commands, 13 and 14, are used to clear the contents of the self-diagnosis (U1, H3, H4) memory stored in the LSI, the program will be cleared automatically upon the completion of the test program 13 or 14.

Ⓒ Test commands, 46,48,49,50,58.
Press the CLEAR key to terminate the test program.

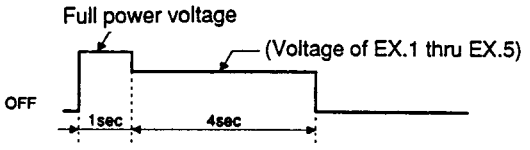
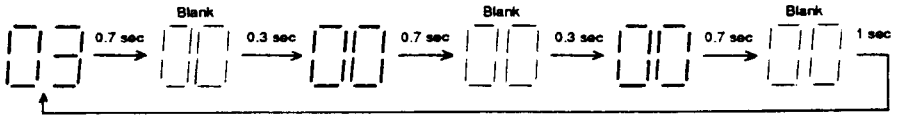
Ⓓ Other test commands
Press the CLEAR key twice to terminate the test program.

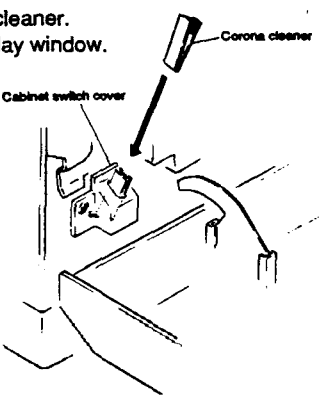


List of test commands SF-7370/7320

No.	Description	Note
1	Checking mirror base movement	Full scan, including test command 2
2	Displaying optical system sensor status (MHPS, MORS, LPS)	
3	Displaying paper sensor status (PID, PPD, POD)	
4	Displaying cassette (CD) and waste toner (TFD) status	
5	Checking operation panel displays	5 seconds
6	Checking heater lamp	5 times of on/off actions.
7	Checking copy lamp	5 seconds
8	Checking developing bias voltage.	30 seconds
9	Checking high voltages (MHV, THV, GRID)	30 seconds
12	Checking discharge lamp and side lamp	30 seconds
13	Cancelling U1 trouble status	
14	Cancelling trouble status other than U1 and U2	
16	Displaying preset maintenance counter	
18	Displaying total copy counter	
19	Displaying maintenance counter	
20	Clearing maintenance counter	
21	Copy aging test	Displaying warmup time
22	Misfeed-free aging test	Displaying aging test (valid only for export version)
23	Fuser idle (heater lamp off), misfeed-free aging test	(Valid only for export version)
24	Disabling warmup function	
25	Checking automatic developer function and checking rotating parts	
26	Checking variable magnification movements (No.4/5 mirror)	(SF-7370 only)
27	Variable magnification aging test (No.4/5 mirror)	(SF-7370 only)
40	Displaying preset developer counter	
41	Displaying developer counter	
42	Clearing developer counter	
46	Adjusting exposure level	
47	Measuring AE sensor characteristics	
48	Adjusting magnification ratio (longitudinal or front and rear frame direction)	(SF-7370 only)
49	Adjusting magnification ratio (transversal or paper transport direction)	(SF-7370 only)
50	Adjusting copy lead edge image	
51	Programming AE again	
58	Adjusting lead edge void area	
72	Programming copy kit	
79	Model and destination setting	
90	Programming reverse rotation time	
91	Programming warmup time	
93	Displaying AE sensor data	
96	Programming fuser temperature	
97	Programming manual feed copy mode	
98	Programming fuser temperature (power save mode)	

Types of test commands and their functions

Test command	Function
01	The mirror base will perform forward and reverse movements automatically, to check the mirror base action. At the same time, action of the sensors (MHPS, MORS) can also be checked. With the SF-7370 the mirror base may be moved forward in the speed of desired magnification ratio in this test command, when the magnification ratio is chosen before depressing the PSW. • ON when the mirror home position sensor (MHPS) is active. • ON when the mirror overrun sensor (MORS) is active. • ON when the lens home position sensor (LPS) is active
02	The mirror base can be moved manually to check activation of the sensor (MHPS, MORS) on the display. The procedure is identical to the test command 1.
03	On/off action of sensor switches (PPD, POD, PID) can be checked on the display. The indicator turns ON when the respective switch is active. • POD (Paper exit detector) • PID (Manual feed paper entry detector) • PPD (Paper pass detector)
04	On/off action of the full waste toner box sensor (TFD) and cassette detector can be checked on the display. The indicator turns ON when the respective switch is active. • CD (Cassette detector) • TFD (Toner full detector)
05	All indicators on the operation panel are turned on for a period of 5 seconds to check for a lamp failure or a related circuit.
06	The heater lamp is turned on and off five times for a period of 0.5 second. Heater lamp turned on for 0.5 second → Heater lamp turned off for 0.5 second Used to check the heater lamp drive circuit. If the heater lamp flashes during the above cycle with the status "H2" or "H4" on display, the failure is in the LSI input line, not the output lines. (Probably thermistor or LSI failure). If the lamps stay ON or OFF continuously, there may be a failure in the triac, heater lamp, or the LSI output lines.
07	The copy lamp is turned on for 5 seconds. During the first one second, a full power voltage is added, then the voltage appropriate to the exposure setting will be added. IMPORTANT: This test command must be executed with the original cover open, in order to prevent continuing exposure of the copy lamp light over the photoconductor drum. Neither, continuing execution of this test command must be avoided. 
08	Developing bias is turned on for 30 seconds. The bias voltage and main PWB line signal checks may be made with this test command.
09	MHV, THV, GRID are turned on for 30 seconds. When a number 1 thru 3 is entered after the test command has started, the grid voltage can be changed. 1 ... 0 (V) 2 ... 750 (V) 3 ... –590 (V)
12	The side blank lamps (SL) and the discharge lamp (DL) turn on for a period of 30 seconds. After the execution of this test command, each side blank lamp turns on alternately from the front frame side (LD401) to the rear frame side (LD410).
13	Used to cancel the status code U1.
14	Used to cancel the status code H3.
16	Used to check the maintenance preset counter contents. Set to 30,000 and its contents will be displayed on the multicopy number display in three cycles to indicate a whole number, two digits at a time. 
18	Used to check the machine's total copy count. Will be displayed in the same manner as (16) above.
19	Actual copy count in the maintenance counter is displayed. Will be displayed in the same manner as (16) above.

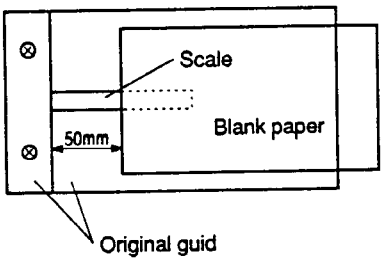
<table>
<tr><th>Test command</th><th>Function</th></tr>
<tr><td>20</td><td>Used to reset the maintenance counter to zero after the completion of machine maintenance.
This test command must be executed after completion of machine maintenance.</td></tr>
<tr><td>21</td><td>1. Used to check the warm-up time.
2. Used to perform the aging test according to the entered copy number.
When the test command is entered, the machine goes into the ordinary machine operating mode, and the warmup time starts to count from 0, and increases every 1 second. The warmup time is indicated on the multicopy number display.
When the RPL turns on, warmup counting is stopped and the display remains as it is. Depression of the CLEAR key, entry of a copy number, and depression of the PSW begins the aging operation until the entered copy number is reached.
The paper misfeed detect function stays active.</td></tr>
<tr><td>22</td><td>Aging test is carried out without using paper.
It would be possible to do the aging test disabling the misfeed detect function.
(Looks similar to the test command 21 and the same applied to the warmup time checking as the test command 21.</td></tr>
<tr><td>23</td><td>Aging test is carried out without using paper.
It would be possible to do the aging test disabling the warmup time, heater system trouble function, and paper misfeed function.
(Looks similar to the test command 21 but the heater lamp (HL) will not be turned on).</td></tr>
<tr><td>24</td><td>Permits machine operational checks by omitting the warmup time.
RPL lights up immediately upon completion of the initial operation after the execution of the test command. It is possible to immediately proceed to check machine operations.</td></tr>
<tr><td>25</td><td>1. Used to check the operating status of the toner sensor (TCS) motor and rotating parts.
[CLEAR] → [0/0] → [0/0] → [CLEAR] → [2] → [5] → [PSW]
([C]) ([C])
2. Used to do the automatic developer adjustment (toner concentration).
(Automatic developer adjusting method)
① Make sure that the DV unit is not loaded in the copier.
NOTE: If a lower toner is met when the main motor starts to rotate after power on, the toner is started to supply. If the DV unit not adjusted was inserted and the power is turned on with toner present in the toner hopper, it affects the toner concentration. It is mandatory to follow the direction given next before adjusting the TCS for new developer.
② Turn power on.
③ Actuate the doorswitch using the corona cleaner.
Status "CH" will come flashing in the display window.
 

④ Execute test command 25. Do not push the print switch.
[CLEAR] → [0/0] → [0/0] → [CLEAR] → [2] → [5] → (CSK) → [PSW]
([C]) ([C]) (With this, the cassette lamp comes active.)
⑤ Insert the DV unit in the copier.
⑥ Press the print switch.
With this, the test command is executed and the developer will be stirred for a period of three minutes. After it was stirred for three minutes, the toner concentration in the developer is interrogated by the main PWB. While the developer is being stirred, the toner sensor input value of 1 thru 99 is displayed. If the value is smaller than "1" or larger than "99", "EU" will be displayed.
The color of the DV unit inserted will be displayed in the following manner:
<table>
<tr><th></th><th>Black</th><th>Red</th><th>Blue</th><th>Brown</th><th>Green</th></tr>
<tr><td>1</td><td>○</td><td>×</td><td>○</td><td>×</td><td>○</td></tr>
<tr><td>2</td><td>×</td><td>○</td><td>○</td><td>×</td><td>×</td></tr>
<tr><td>3</td><td>×</td><td>×</td><td>×</td><td>○</td><td>○</td></tr>
</table>
○: ON ×: OFF
NOTE: If the test command was terminated in a middle of its operation, the toner concentration may not be recognized.</td></tr>
</table>

<table>
<tr><th>Test command</th><th>Function</th></tr>
<tr><td>26
(SF-7370 only)</td><td>The lens moves from normal → 100% → 80% → 70% → 122% → 100% (AB series)
The lens moves from normal → 100% → 75% → 64% → 124% → 100 (Inch series)
The lens stops for 0.5 second at each position.
Used to check lens base operation.</td></tr>
<tr><td>27
(SF-7370 only)</td><td>(AB series)
Normal → x0.80 → x0.70 → x1.22
(Inch series)
Normal → x0.75 → x0.64 → x1.24
Lens stops through the ratios continuously.
The lens stops for 0.5 second at each position.
Used to aging the lens base operation.</td></tr>
<tr><td>40</td><td>Displays the contents of the developer preset counter of the developer unit in use, in a similar manner as test command 16.
Similar to test command 25 for displaying of the color of the developer unit.</td></tr>
<tr><td>41</td><td>Displays the contents of the developer counter of the developer unit in use, in a similar manner as the test command 25.
Similar to test command 25 for displaying of the color of the developer unit.</td></tr>
<tr><td>42</td><td>Resets the contents of the developer counter, in a similar manner as test command 16.
This test command must be executed upon replacement of the developer.
Similar to test command 25 for displaying of the color of the developer unit.</td></tr>
<tr><td>46</td><td>Test command for exposure adjustment
Adjustments are done in each mode of manual, photo, and AE (CPC).
There are eight kinds of data that can be programmed by the test command, and data are entered on the numeric keypad.
The exposure select key is used to change the exposure mode which can be done by the dark and light key.
<table>
<tr><th>Exposure mode</th><th>Lamp state</th><th>EX.1</th><th>EX.5</th></tr>
<tr><td>Manual</td><td>MEL ON</td><td>MEMAX</td><td>MEMIN</td></tr>
<tr><td>Photo</td><td>PEL ON</td><td>PEMAX</td><td>PEMIN</td></tr>
<tr><td>AE</td><td>AEL ON</td><td>KP</td><td>AEMIN</td></tr>
<tr><td>AE(CPC)</td><td>AEL, PEL ON</td><td>KP, CPC</td><td>AEMIN.CPC</td></tr>
</table>
MEMAX : Manual exposure upper limit
MEMIN : Manual exposure lower limit
PEMAX : Photo exposure upper limit
PEMIN : Photo exposure lower limit
AEMIN : AE exposure lower limit (exposure level for a blank original)
KP : AE exposure deviation
AEMIN.CPC : AE, CPC mode exposure lower limit (exposure level for a blank original)
KP.CPC : AE, CPC mode exposure deviation
(Adjusting method)
① Execute test command 46.
[CLEAR] → [0/0] → [0/0] → [CLEAR] → [4] → [6] → [PSW]
([C]) ([C])
At the same moment the machine starts to warm up, the value presently programmed (MEMAX) is displayed. The ready lamp turned on after the warmup has completed and it will become ready to make copy or to program.
② Enter a number for an optimum result and do the adjustment. As the exposure select key is pressed, the mode changes in order of:
ManualPhotoAEAE(CPC mode)Manual
Press the dark key to change from EX.1 to EX.5.
Press the light key to change from EX.5 to EX.1.
Use a number between 0 and 90.
Press the print switch after the number has entered, then a copy in that mode will be produced.
③ Terminate the test command 46.
Press the clear key.</td></tr>
<tr><td>47</td><td>AE sensor pot adjustment and AE sensor output characteristic measuring test command
(Adjusting method)
① Place four to five sheets of blank paper over the original table.
② Execute test command.
[CLEAR] → [0/0] → [0/0] → [CLEAR] → [4] → [7] → [PSW]
([C]) ([C])
The mirror base starts to scan and stops at the AE sensor measuring position, and the RPL comes active. At the same moment, the value of the previously measured AE sensor will be displayed in a hexadecimal number.
③ Press the print switch after the ready lamp has turned on.
The copy lamp will come active and the input value of the present AE sensor will be displayed.</td></tr>
</table>

Test command	Function
	④ Adjust the AE sensor adjusting pot on the main PWB. After the copy lamp has turned on, adjust the input value between E0H and F0H using the AE sensor adjusting pot. Clockwise turn of the pot increases the input number and vise versa. When the input value is within the limits, the cassette lamp will come active. After the AE sensor adjustment has completed, press the print switch to change to the AE sensor output characteristics measuring mode. If the print switch was not pressed within ten minutes after the copy lamp has turned on, it will automatically change to the AE sensor output characteristics measuring mode. In the AE sensor output characteristics measuring mode, the copy lamp drive voltage automatically shifts and the AE sensor output characteristics of that time is automatically measured and stored in the memory. If the adjustment was not finished within ten seconds, press the print switch once again after the ready lamp turned on and make adjustment. ⑤ Terminate the test command 47. CLEAR key (twice)
48 (SF-7370 only)	Vertical (towards front and rear frame sides) magnification ratio adjusting test command The magnification ratio towards the vertical copy direction (front frame and rear frame) can be adjusted by varying the lens stop position. (SF-7370 only) (Adjusting method) ① Place the scale on the original table along the front and rear frame sides. ② Execute test command 48. [CLEAR] → [0/0] → [0/0] → [CLEAR] → [4] → [8] → [PSW] ([C]) ([C]) At the same moment the machine starts to warm up, the present value between 2 and 9 will be displayed. After the warmup has completed, the ready lamp turns on and copy becomes enabled. ③ Make a normal (x1.0) copy on an A4 (8½" x 11") paper. ④ Compare the size of the scale image on the copy with the actual scale size and obtain the vertical magnification ratio using the following formula. Vertical direction magnification ratio compensation rate [%] = $\frac{\text{(size of original)} - \text{(size of scale on the copy)}}{\text{(size of original)}} \times 100$ ⑤ Use the following formula to obtain the vertical magnification ratio preset value. Vertical magnification ratio preset value = previous value (the number shown in (2) above) + vertical magnification ratio compensation rate x 10 ⑥ Program the preset value. [ ] → [PSW] When the preset value is changed by "1", the magnification ratio changed 0.1%. ⑦ Make a normal (x1.0) copy and compare the scale image with the scale size. ⑧ Adjustment will be satisfactory if the size of the scale image on the copy is within ±0.8% with respect to the actual size of the scale. If not, repeat the above procedures ③ thru ⑦ to adjust it once again. If the input number was smaller than "2" or larger than "9", it may not enable to correct the magnification ratio with this test command. In such event, move the slit plate on the lens base towards the paper entry side if smaller than "2", or, move it towards the paper exit side if larger than "9". Then, do the adjustment all over again. ⑨ Terminate the test command 48. CLEAR
49 (SF-7370 only)	Horizontal direction (towards paper transport direction) magnification ratio adjusting test command The horizontal (paper transport direction) magnification ratio can be adjusted by varying the mirror base scan speed. (SF-7370 only) (Adjusting method) ① Place the scale over the original table along the paper moving direction. ② Execute test command 49. [CLEAR] → [0/0] → [0/0] → [CLEAR] → [4] → [9] → [PSW] ([C]) ([C]) At the same moment, the machine starts to warm up, the presently programmed number between 1 and 99 will come displayed. The ready lamp comes active after the warmup has completed and it becomes ready to make copy. ③ Make a normal (x1.0) copy on the A4 (8½" x 11") paper. ④ Compare the size of the scale image on the copy with the actual scale size and obtain the horizontal magnification ratio using the following formula. Horizontal direction magnification ratio compensation rate [%] = $\frac{\text{(size of original)} - \text{(size of scale on the copy)}}{\text{(size of original)}} \times 100$ ⑤ Use the following formula to obtain the Horizontal magnification ratio preset value. Horizontal magnification ratio preset value = previous value (the number shown in ② above) + horizontal magnification ratio compensation rate x 10 ⑥ Program the preset value. [ ] → [ ] → PSW When the preset value is changed by "1", the magnification ratio will be changed 0.1%. ⑦ Make a normal (x1.0) copy and compare the scale image with the scale size. ⑧ Adjustment will be satisfactory if the size of the scale image on the copy is within ±0.8% with respect to the actual size of the scale. If not, repeat the above procedures ③ thru ⑦ to adjust it once again.

Test command	Function
	⑨ Terminate the test command 49. CLEAR
50	Copy lead edge image position adjusting test command Adjustment is done by changing the RRS on timing so that the image of the original may be copied onto appropriate location of the copy paper. Before starting the test command 50, be sure to check the horizontal magnification ratio if appropriate. If not, do the test command 49 to adjust the magnification ratio. There are some differences in the adjustment procedures between the SF-7320 and the SF-7370. (Adjusting method) (SF-7320) ① Place the scale over the original table along the paper moving direction. ② Execute test command 50. [CLEAR] → [0/◊] → [0/◊] → [CLEAR] → [5] → [0/◊] → [PSW] ([C]) ([C]) At the same moment the machine starts to warm up, the presently programmed number between 0 and 99 will be displayed. Description of RRS-a: After completion of the warmup, the ready lamp will come active and become ready to make a copy. ③ Program the RRS-a to "0". [0/◊] → [0/◊] ④ Press the print switch and make a copy. ⑤ Measure the distance between the lead edge of the paper and the lead edge of the image on the copy. ⑥ Obtain the value of RRS-a. If the value measured in ⑤ is assumed to be L1; RRS-a = 2.778 x L1 + 6.944 Unit in mm, rounded. ⑦ Enter the value of RRS-a obtained in ⑥. [ ] → [ ] ⑧ Make a copy and make sure that the lead edge image loss is within the limits of −2.5±1.5mm. If not, change the value of RRS-a and do adjustment so that it may be within the limits. ⑨ Terminate the test command 50. CLEAR (SF-7370) ① Place the scale over the original table along the paper moving direction. ② Execute test command 50. [CLEAR] → [0/◊] → [0/◊] → [CLEAR] → [5] → [0/◊] → [PSW] ([C]) ([C]) At the same moment the machine starts to warm up, the presently programmed number between 0 and 99 will be displayed. Description of RRS-a: After completion of the warmup, the ready lamp will come active and become ready to make a copy. ③ Program the RRS-a to "0". [0/◊] → [0/◊] ④ Turn the paper select key on. The cassette lamp turned active changes to blink and the presently programmed number between 0 and 99 will be displayed. Description of RRS-b ⑤ Program the RRS-b to "0". [0/◊] → [0/◊] ⑥ Make one each of copy in the normal (x1.0) and reduction mode (x0.64), and measure the distance between the copy lead edge and the scale image lead edge. ⑦ Obtain values for RRS-a and RRS-b. L1 = distance between the copy paper lead edge and the scale image lead edge in the normal (x1.0) mode. L2 = distance between the copy paper lead edge and the scale image lead edge in the reduction (x0.64) mode. Substitute the values of L1 and L2 into the following formulate to obtain RRS-a and RRS-b. RRS-a = 7.716 x (L1 − L2) RRS-b = ((11.574 x L2) − (7.407 x L1)) + 60.417 Unit in mm, rounded. ⑧ Turn the paper select key on. The blinking cassette lamp changes to permanent on. ⑨ Program the value of RRS-a that obtained in ⑦. [ ] → [ ] ⑩ Program the value of RRS-b that obtained in ⑦. Paper select key (cassette lamp on $ blink) [ ] → [ ] ⑪ Make a copy in the normal (x1.0) mode and make sure that the lead edge image loss is within −2.5±1.5mm. If not, change the value of RRS-b and do adjustment so that it may be within the limits. ⑫ Terminate the test command 50. CLEAR

st command	Function
58	Copy lead edge void area adjusting test command The void area width at the copy lead edge is adjusted by varying the GRID on timing. This test command must be executed after the copy lead edge location has been completed using the test command 50. (Adjusting method) ① Place the scale and a blank paper on the original table.  ② Execute test command 58. [CLEAR] → [0/◊] → [0/◊] → [CLEAR] → [5] → [8] → [PSW] ([C]) ([C]) At the same moment the machine starts to warm up, the presently programmed number between 1 and 99 will be displayed. The ready lamp comes active after the warmup has completed and becomes ready to make a copy. ③ Make a normal (x1.0) copy with the original cover left open. ④ Enter a number and make adjustment. Increasing the number makes the void area wider and vice versa. By changing the number by "1" will change the void area by about 0.12mm. ⑤ Terminate the test command 58. CLEAR
72	Copy kit programming test command (Programming method) ① Execute test command 72. [CLEAR] → [0/◊] → [0/◊] → [CLEAR] → [7] → [2] → [PSW] ([C]) ([C]) At the same moment the ready lamp comes active, the presently programmed number between 1 and 4 will be displayed. ② Enter a number to select the copy kit out of the table below. [ ] → [PSW] With this, the number is stored in the memory and the ready lamp turns off.

Parameter	Developer lamp DML active after		Maintenance lamp DRL active after	
	Black	Color	Mini-maintenance	Normal maintenance
1	30000 copies	5000 copies	10000 copies	30000 copies
2	30000 copies	5000 copies	15000 copies	30000 copies
3	30000 copies	5000 copies	30000 copies	30000 copies
4	Does not turn on	5000 copies	Does not turn on	Does not turn on

	③ Terminate the test command 72. CLEAR CLEAR
79	Programming model and destination (Programming method) ① Execute test command 79. [CLEAR] → [0/◊] → [0/◊] → [CLEAR] → [7] → [9] → [PSW] ([C]) ([C]) At the same time the ready lamp turns active, the presently programmed number will be displayed. ② Select and enter a number appropriate to the model and destination from the table below. [ ] → [PSW] Press the print switch to store the number in the memory. The ready lamp turns off.

	SUK	AB series except SUK	SEC	Inch series except SEC	Indonesia
SF-7320	1	5	6	7	25
SF-7370	11	15	16	17	35

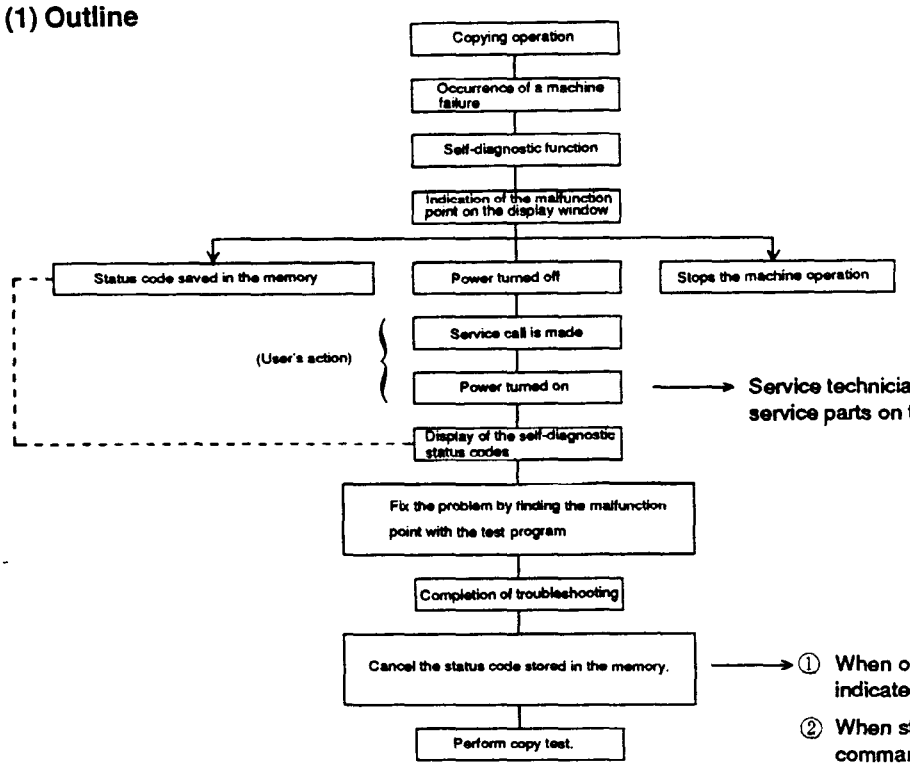
	③ Terminate the test command 79. CLEAR CLEAR

<table>
<tr><th>Test command</th><th>Function</th></tr>
<tr><td>90</td><td>Used to program the drum cleaning mode. (Main motor reverse rotation period programming after the completion of copy operation)
After the test command has executed, "10" will be displayed for the 10-second mode or "60" for the 60-second mode. Press the paper select key to change it from 10 to 60 then to 10 again, which will be displayed in the multicopy window. To select the mode, press the print switch.</td></tr>
<tr><td>91</td><td>Used to program the warmup mode. (Main motor rotation mode programming during the heat roller warmup)
After the test command has executed, the presently programmed warmup mode is displayed in the multicopy window in terms of a number.
Select the mode number to be used using the 1,0 key and press the print switch to set the mode.
<table>
<tr><th>Number</th><th>Warmup mode</th></tr>
<tr><td>0</td><td>Normal mode</td></tr>
<tr><td>1</td><td>Main motor rotations before the heater warmup terminates.</td></tr>
</table></td></tr>
<tr><td>96</td><td>Used for setting the fusing temperature. 165 - 175
When this command is executed, the lower two digits of the currently set fusing temperature are displayed. (Example: "75" means 175 degrees Centigrade.)
Under this state, push the paper select key, and the fusing temperature will be changed by 5 degrees. Repeat pushing until the desired temperature is obtained.</td></tr>
<tr><td>97</td><td>Used to select whether the manual copy mode is started automatically or by pushing the PSW.
Method:
1) When this test command is executed, the currently stored manual copy mode parameter (see table below) is displayed and the ready lamp turns on.
2) After the ready lamp turns on, enter the parameter using a figure 0 or 1 for the mode to be set. Depress the PSW and the parameter is then stored in the memory and the ready lamp goes out.
<table>
<tr><th>Parameter</th><th>Manual copy mode</th></tr>
<tr><td>0</td><td>Auto start mode</td></tr>
<tr><td>1</td><td>PSW start mode</td></tr>
</table>
* Invalid when the multi-bypass stacker is installed. (Copy starts after depression of the PSW, when the multi-bypass stacker is installed.)</td></tr>
<tr><td>98</td><td>Used for setting the fusing temperature in the power saving mode.
When this command is executed, the lower two digits of the currently set fusing temperature in the power saving mode are displayed.
Under this state, push the paper select key, and the fusing temperature will be changed by 5 degrees. Repeat pushing until the desired temperature is obtained.
150 — 165</td></tr>
</table>

4. Self-diagnostic functions

When the copier malfunctions, operations are suspended immediately and a status code is indicated on the multicopy number display. Status codes are represented as an alphanumeric combination of figures.

(1) Outline


Copying operation
Occurrence of a machine failure
Self-diagnostic function
Indication of the malfunction point on the display window
Status code saved in the memory
Power turned off
Stops the machine operation
(User's action)
Service call is made
Power turned on
Display of the self-diagnostic status codes
Fix the problem by finding the malfunction point with the test program
Completion of troubleshooting
Cancel the status code stored in the memory.
Perform copy test.

→ Service technician should make the service call with necessary service parts on the basis of the trouble status reported by the user.

→ ① When one of the test status codes L1, L3, L5, H2, or H4 is indicated, it may be cleared by turning the power off.

② When status U1 is indicated, it may be cleared by test command 13.

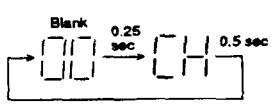
③ When status code CH or PC is indicated, it may be cleared automatically upon completion of troubleshooting, without entering a test command.

④ When status code H3 is indicated, it may be cleared by test command 14.

(2) Status code

Status codes will be displayed on the copy number display window in the manner shown.

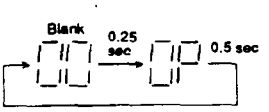
① CH, L1, L3, L5, H2, H3, H4, U1, U2, U3, EE



② PC, P (Turn on), EL, EU

Always displayed as:

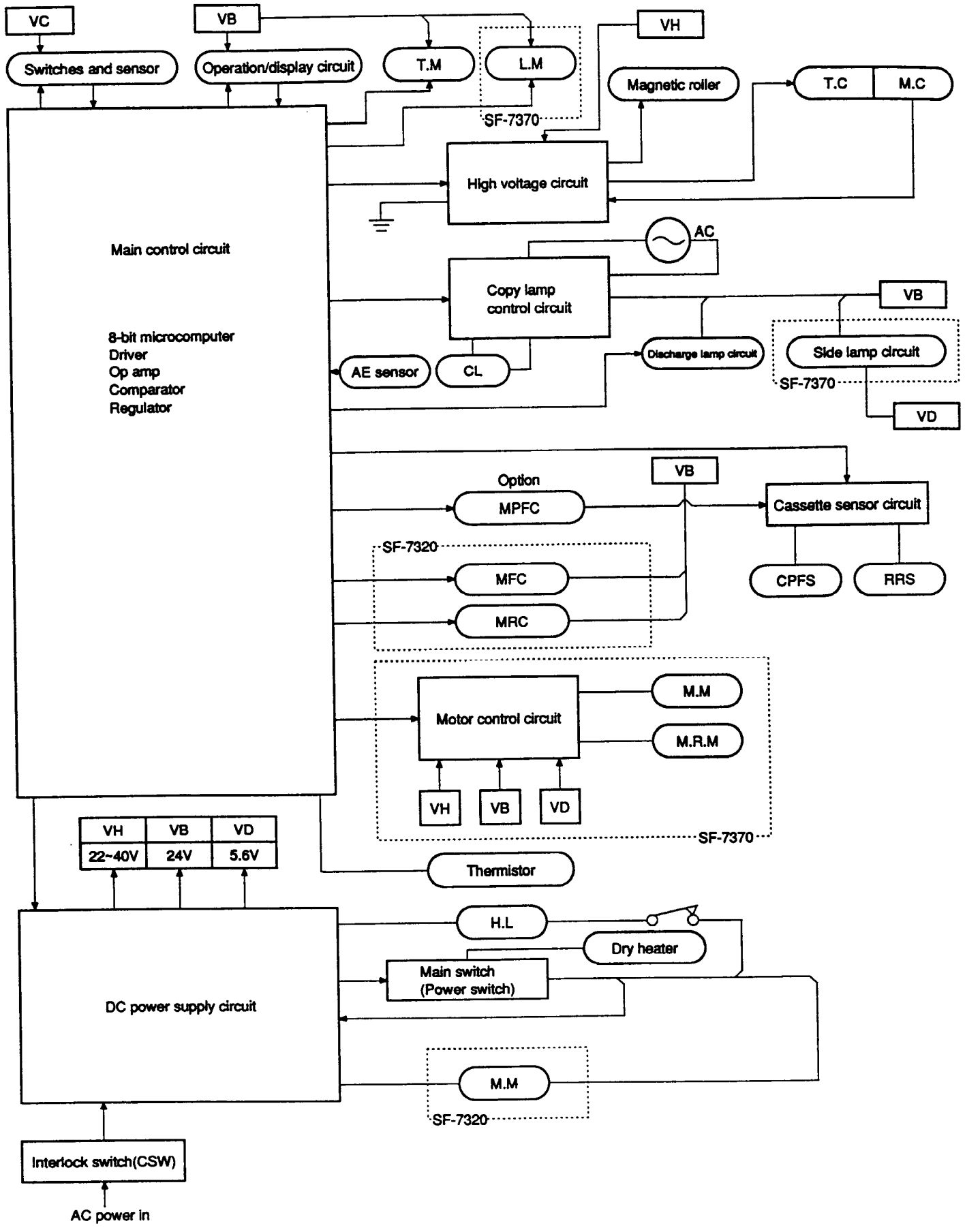
③ P (Turn on and off)



Status	Trouble symptom
L1	Mirror base feed trouble • If the mirror home position sensor (MHPS) did not turn off within one second after the start of the mirror. • If the mirror base forward movement was not completed within ten seconds after the start of the mirror base. • If the mirror base was not on the MHPS position when the mirror base started to move forward during copying.
L3	Mirror base return trouble • If the MHPS did not turn on within six seconds after the mirror base started to return.
L5	Magnification rated trouble (lens, No.4/5 mirror) • If it did not move to the given location within fifteen seconds after the lens motor started to operate.
H2	Open heat roller thermistor
H3	Heat roller irregularly high temperature
H4	Heat roller irregularly low temperature • If the heat roller temperature did not reach the prescribed temperature within the given time after the start of the heat roller warmup operation. • If an irregularly low temperature was met after reaching the prescribed temperature.
U1	Low memory backup battery voltage
U2	Backup memory counter sumcheck error
U3	AE sensor trouble • If the AE sensor output voltage did not change in regard to the copy lamp voltage in test command 47.
EE	TCS (Toner control sensor) input trouble • The TCS level was obtained and stored in the RAM by the test command 25, but the value obtained is out of the limits.
EU	If the TCS input voltage by test command 25 is above the limit.
EL	If the TCS input voltage by test command 25 is under the limit.
CH	DV unit not installed or poor connector insertion.
PC	Personal counter not installed for the machine programmed for the personal counter.
P (blink)	During the time cassette feed or multi-bypass stacker is used, if the PPD (paper entry sensor) failed to turn on (paper empty or misfeed) within the given time after the paper feed solenoid (CPFS, MPFS) have turned on.
P	If the cassette was not installed on its given location.

[10] Electrical section

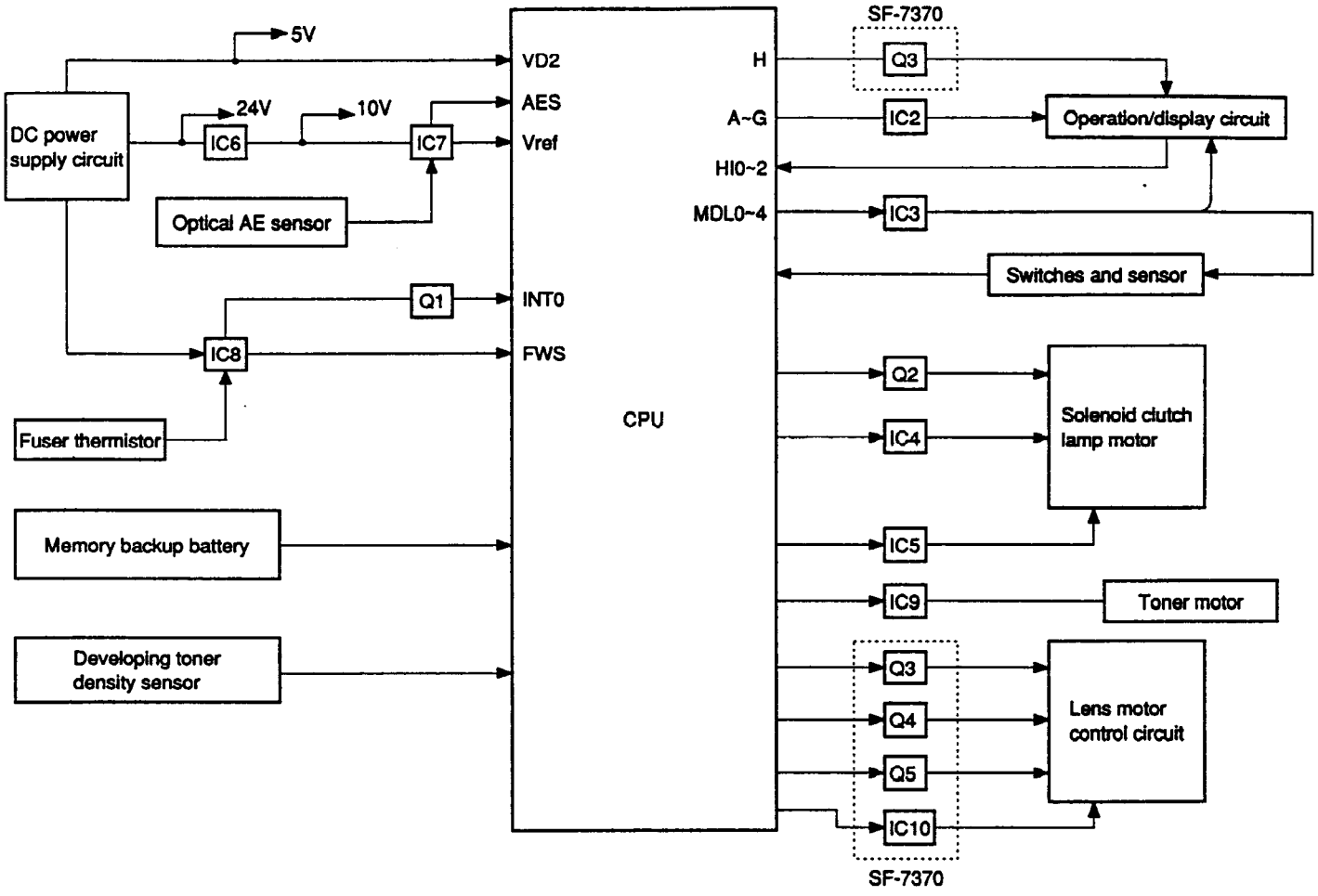
1. General block diagram



2. Main control circuit

The main control circuit control circuits and their actions. Data are stored in the memory (RAM) and backed up by the backup battery.

(1) Block diagram



3. CPU

A single chip TMP91C75 microcomputer with internal memory is used for the CPU (IC1).

- 8-bit ALU
- Memory
  512KB RAM, 16KB ROM
- Analog/digital conversion features (A → D)
  Fuser temperature control (RTH signal)
  Automatic exposure control (AES signal)
  Developer toner concentration control (TCS signal)
  Developer tank color identification (DVC signal)
  Battery voltage monitor (BATV signal)
- Pulse width conversion feature
  Light source lamp intensity data (CLCLK signal)
  Side lamp control data (SLCLK signal)
  Main motor control data (MMCLK signal)
- Program pulse generation feature
  SF-7370 optical system drive control (MRCLK signal)

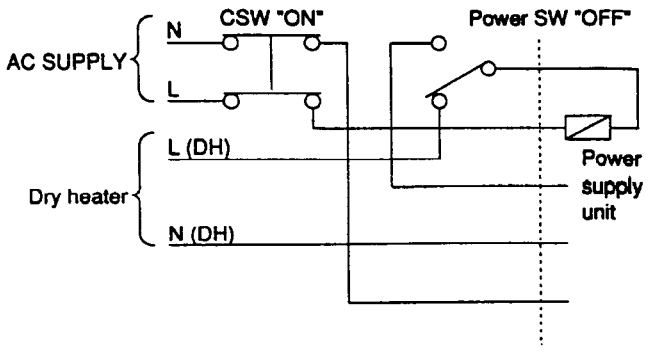
4. CPU signal description

Pin No.	IN/ OUT	Signal name	Function
1	IN	VREF	A/D converter reference voltage (+5V)
2	—	AGND	A/D converter ground
3	IN	RTH	Fuser thermistor temperature sense signal
4	IN	AES	Automatic exposure sensor signal
5	IN	TCS	Developing unit toner density sensor sense signal
6	IN	DVC	Developing tank color identification signal
7	IN	BATV	Backup battery voltage monitor signal
8	IN	U2,S80	U2 trouble status cancel signal (S.80 reset sense signal)
9	OUT	SLCLK	Side lamp control frequency signal
10	OUT	BIAS	Developing bias control signal
11	OUT	MGS1	Mirror motor gain switch signal
12	OUT	H.L	Fuser heater lamp control signal
13	OUT	CLCLK	Light source lamp control signal
14~16	IN	KI0~KI2	Operation key sense signal
17	IN	INT0	Power on sense signal
18	IN	INT1	MHPS sense signal
19	IN	INT2	Power supply zero cross pulse signal sense signal
20	OUT	MRCLK	Optical system drive control signal
21	IN	NMI	Power off sense signal
22	IN	RESET	Initial reset signal
23	—	CLK	NC
24~30	OUT	A~G	Display segment control signal. Operation key sensor signal.
31	OUT	H	Display segment control signal (SF-7370 only).
32	—	VSS	GND
33~34	IN/ OUT	X1/X2	Basic clock pulse
35	OUT	MM	Main motor control signal
36	OUT	RRS	Resist roller solenoid control signal
37	OUT	MPFS	Multifeed unit solenoid control signal
38	OUT	CPFS	Cassette feed solenoid control signal
39	OUT	MRC	Mirror return clutch control signal
40	OUT	MFC	Mirror feed clutch control signal
41	OUT	G CNT	Main corona grid on/off control signal
42	OUT	TC	Personal counter increment signal
43~47	OUT	MDL0~ MDL4	Display LED control signal
48~49	OUT	TM0,TM1	Toner motor control signal
50	OUT	MTHV	Main/transfer corona control signal
51~54	OUT	LM0~LM3	Lens motor control signal
55	IN	VD2	+5V supply
56	IN	I0	Sensor detect strobe signal
57	IN	I1	Sensor detect strobe signal I0: PID, POD, TFD, — I1: PPD, MORS, PNC, CD
58	OUT	G H/L	Main corona grid select signal
59	OUT	MGS0	Mirror motor gain select signal
60	IN	MFD	Multifeed unit presence sense signal
61	OUT	CFM	Cooling fan motor control signal
62	OUT	DL	Discharge lamp control signal
63	IN	LPS	Lens position sensor signal
64	IN	VD2	+5V supply

VD2: Power is always supplied. About +3V when the power is off.
+5V when the power is on.
VD1: +5V is supplied only when the power is on.

5. Switches and sensors

(1) Power switch and CSW

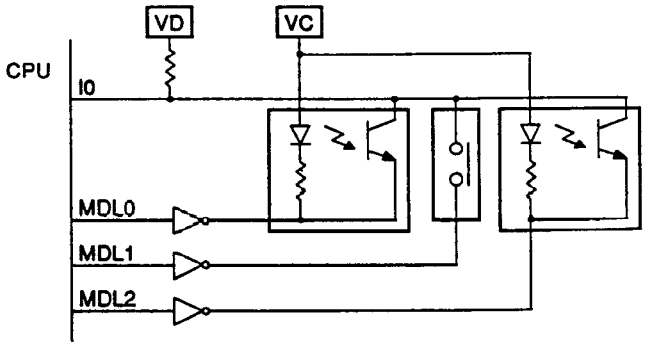


When the front panel is opened, the CSW is set open so that the entire power supply is turned off including the display.
When the front panel is closed, the CSW is closed so that the power is on to all components concerned.
If the power switch is at on in this instance, the power is supplied to the machine. If the power switch at off, the power is on to the dry heater.

(2) PPD, PID, POD, TFD, MORS, CD, PNC

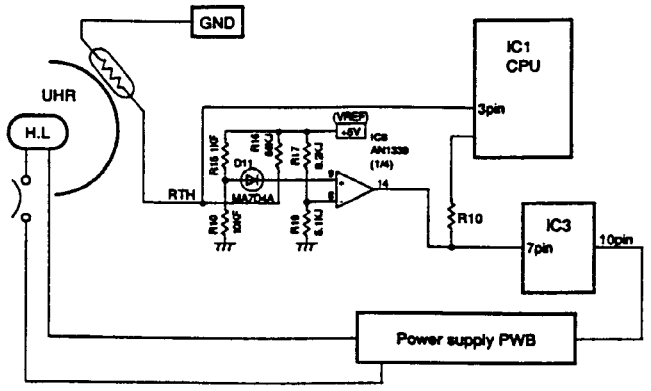
(Sensor matrix)

	MDL0	MDL1	MDL2	MDL3
I0	PID	POD	TFD	—
I1	PPD	MORS	PNC	CD



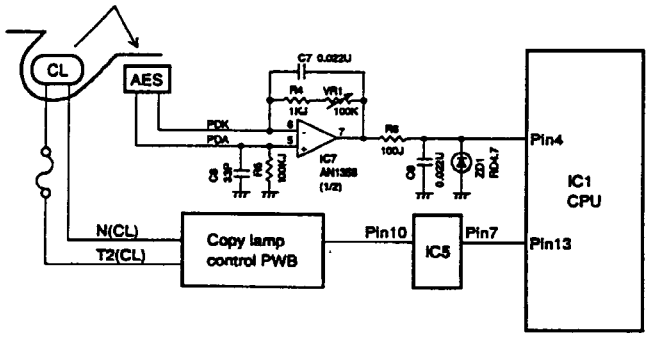
To hold capacity of the switch driving power supply (VC) to a minimum, the sensor operation timings (MDLX) are selected by multiplexing. Therefore, test command 1 to 4 need to be executed to check action of each sensor.
* MHPS, LPS
For it is for the control of the DC power supply level, the operation can be checked using the multimeter.

6. Fuser temperature control



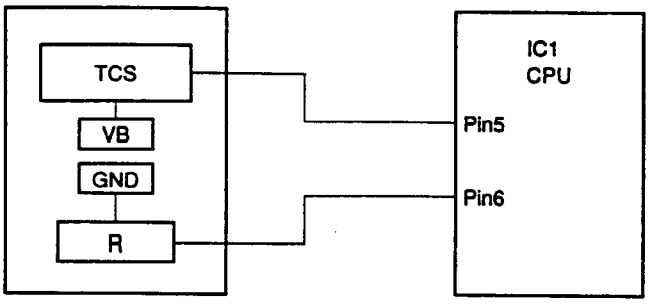
The fuser temperature control circuit is provided to maintain the fuser heat roller surface temperature always at the given level using the thermistor.
The fuser heat roller surface temperature is supplied to the analog port of the CPU (IC1) as a thermistor terminal voltage.
The pin 8 of the comparator (IC8) is connected with the limit voltage input which VREF is divided by R17 and R19. When the voltage of RTH goes below the limit, the comparator output turn low which forces the signal HT low. So, the heater lamp drive signal HL is forced low despite of the CPU command so as not to activate the heater lamp.

7. Copy lamp control



The copy lamp control circuit keeps the copy lamp intensity to the predetermined level in the manual exposure mode. In the automatic exposure mode, the copy lamp intensity is regulated according to the contrast of a document using the automatic exposure sensor.
After the print switch has turned on, the full power is applied to the copy lamp for a period of 150ms to stabilize the copy lamp intensity.
In the case of the manual exposure mode, the CPU (IC1) sends the CLCLK signal corresponding to the exposure level. The pulse width of CLCLK is varied according to exposure level.
In the case of the automatic exposure mode, the contrast of the document is sensed by the automatic exposure sensor (AES) and sent to the analog port of the CPU (IC1) via the amp circuit (IC7). The CPU issues the CLCLK signal appropriate to an input level.

8. Developing toner density control/developer tank color identification

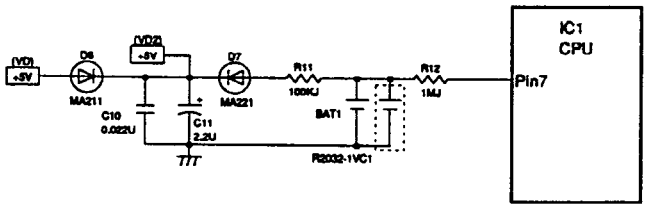


The developing toner density control circuit monitors the toner density within the developer in the developing tank and the sensor output (TCS) is sent to the analog line of the CPU (IC1).
When the test command 25 is executed, the TCS signal output level is stored in the CPU internal memory in a form of a binary code and the level will not be revised until the test command 25 is executed next time. After power on, the toner density is sensed while the main motor is running and compared with the level stored in the memory. If the toner density is low, the toner is replenished through the toner hopper.

Color	Resistance value	CPU input voltage (Pin.6)
Black	0Ω	below 1.6V
Red	3KΩ	1.6V~2.42V
Blue	6.2KΩ	2.42V~3.17V
Brown	12.0KΩ	3.17V~3.79V
Green	24.0KΩ	3.79V~4.71V
Hot installed	∞	Above 4.71V

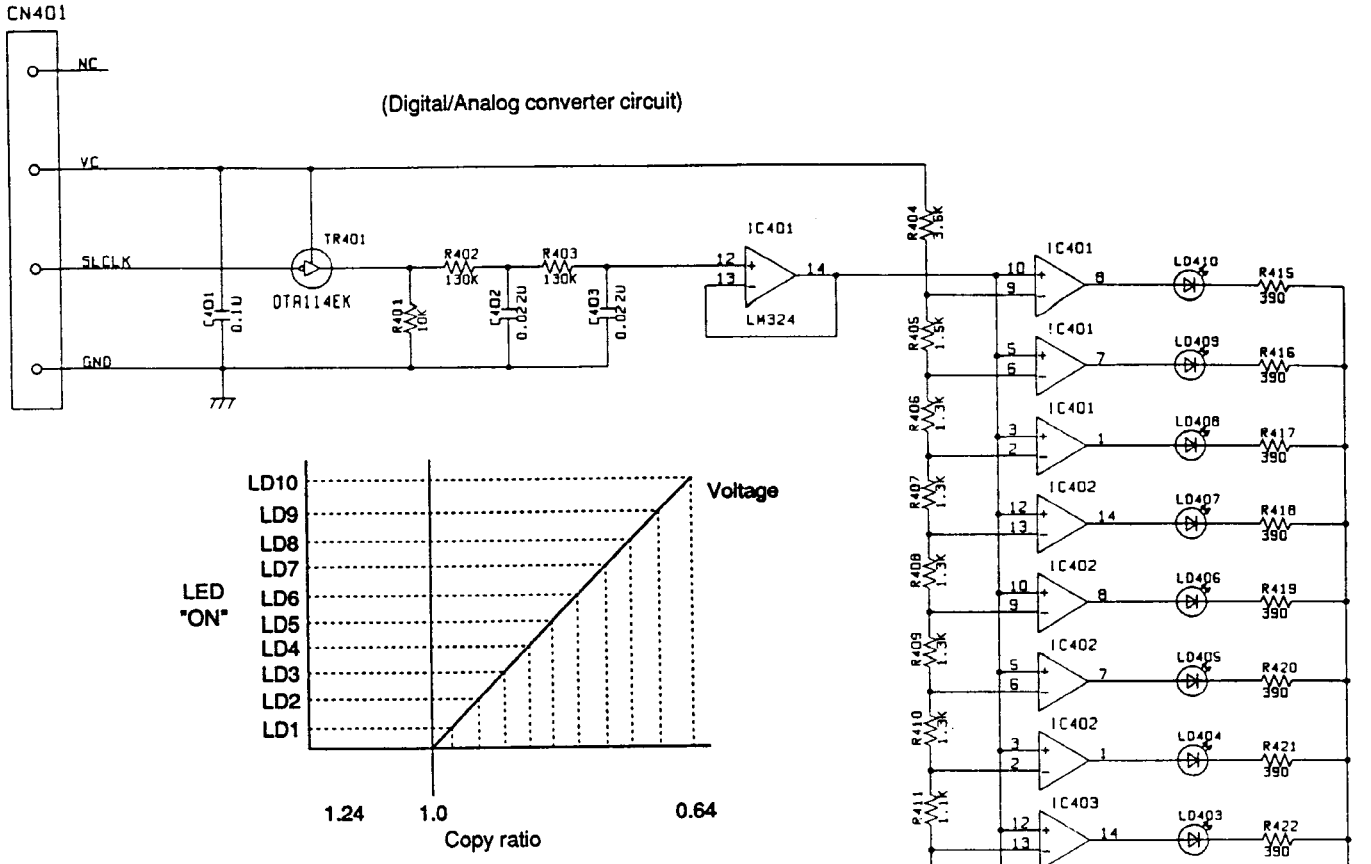
In a developing unit of each color, a different resistance is connected in order to discriminate the color of toner.

9. Backup battery voltage measurement



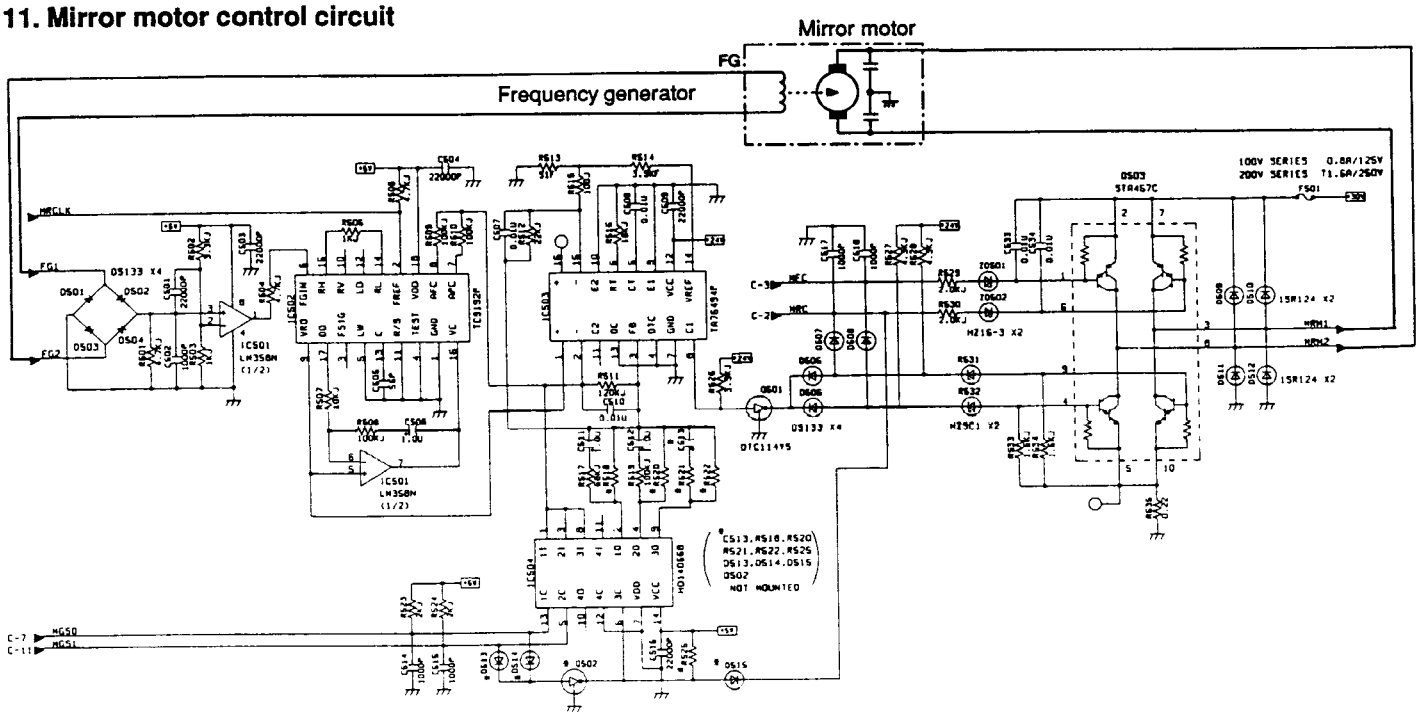
The backup battery voltage circuit senses the output voltage immediately after power on to send it to the analog input line of the CPU (IC1).

10. Side lamp control circuit



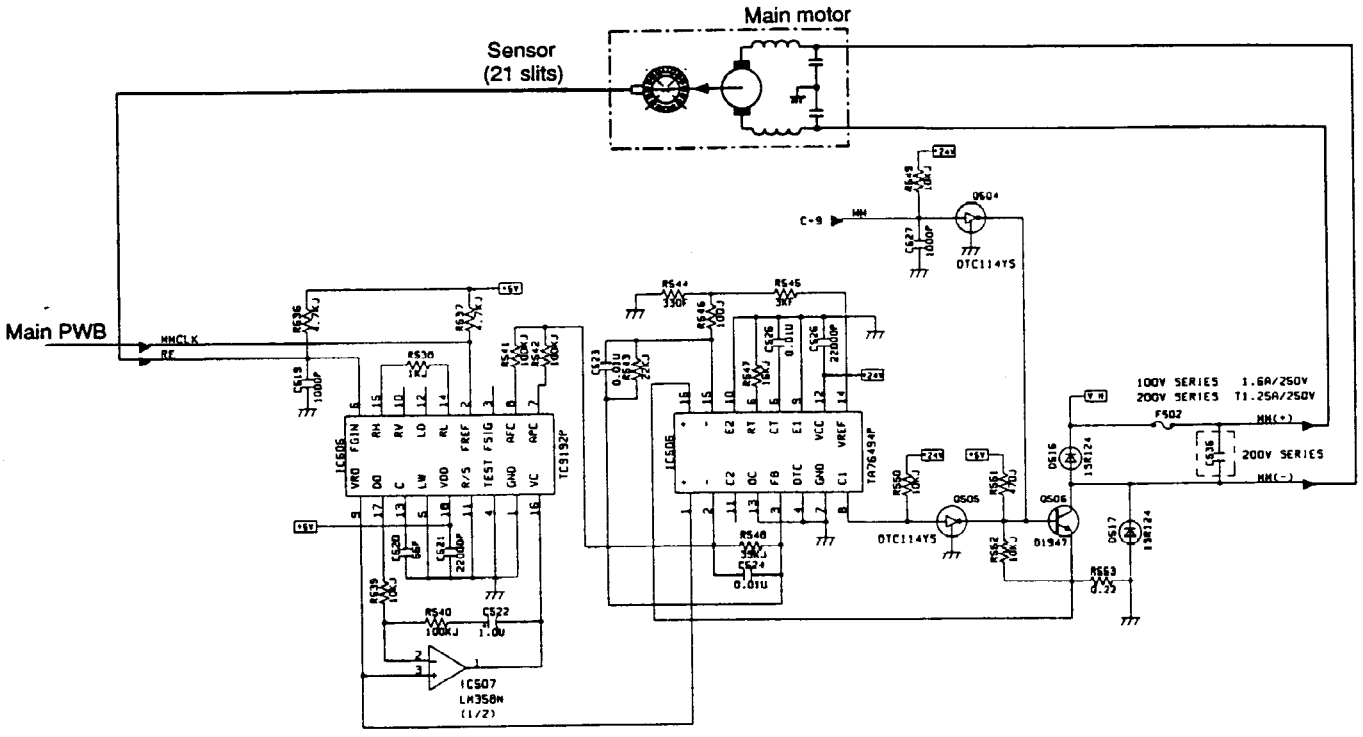
With the SF-7370, the side areas are erased by the side lamp (LED) in the reduce copy mode.
The main CPU supplies the CLCLK signal proportionate to the reduction ratio to the digital/analog converter circuit of the side lamp PWB. When the reduction ratio is at 64%, the pulse width of the CPU output SLCLK is larger and the output voltage via the amp circuit increases, and the LED driving op amp outputs turn on to activate all the LEDs. When the magnification ratio is more than 100%, the pulse width of the CPU output signal CLCLK decreases so that not all LEDs activate.

11. Mirror motor control circuit



With the SF-7370, the frequency signal (MRCLK) proportionate to a copy magnification ratio (64% to 124%) is sent to the mirror motor control PWB from the CPU (motor rotation control signal). Since the frequency generator is provided in the mirror motor unit, a 12Hz signal is issued per rotation of the motor. This frequency generation signal (FG) is full wave rectified in the rectifier circuit and sent to the pin 6 of IC502 of the mirror control PWB as a motor rotation information of 24 pulses per rotation and monitored to synchronize with the magnification data (MRCLK) from the CPU.
By making forward and reverse rotations, the mirror motor scans the optical system. The mirror forward/reverse data is dependent on the MFC (forward) and MRC (reverse) signals from the CPU.

12. Main motor control circuit

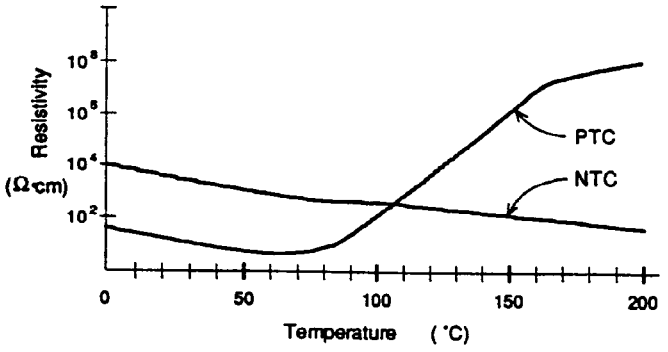


With the SF-7370 and SF-7320, the signal output CLCLK is sent to the main motor control circuit as a main motor control clock signal (MMCLK).
A timing disk that may generate 21 pulses per rotation is attached to the main motor unit. Every time the motor rotates, the rotary encode signal (RE) is issued which is monitored, to synchronize with the main motor control clock from the CPU.

[11] SUPPLEMENT

[Thermistor]

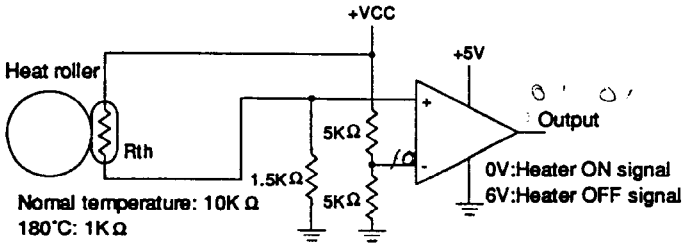
The thermistor is a heat-sensitive semiconductor whose resistance varies according to the ambient temperature.
The thermistors are divided into two groups: (1) NTC (Negative Temperature Coefficient) thermistors whose resistances decrease as the temperature rises, and (2) PTC (Positive Temperature Coefficient) thermistors whose resistances increase as the temperature rises.



The NTC thermistors are more commonly used.

[Operation]

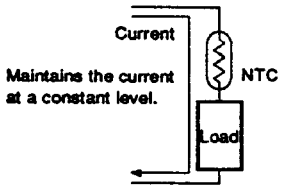
The thermistors are used to control fusing temperature in the copier machines. The thermistor is pressed on the fusing roller to detect the temperature change.



Example of use in a copier

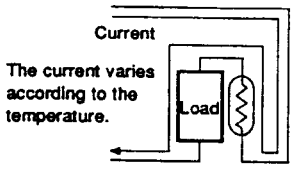
[When NTC thermistors are used]

When the ambient temperature rises, the circuit resistance increases to change the output current (power). In this case, however, the NTC resistance decreases to maintain the composite resistance of the circuit at a constant level, thus maintaining the passing current at a constant level.



[When PTC thermistor is used]

The load and PTC is connected in series. The load temperature by heating is detected and the PTC resistance rises as the temperature rises, reducing the current flowing through the load. Thus the current is adjusted so that heating is reduced.



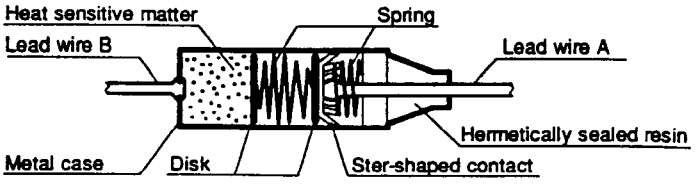
[Thermal fuse]

The thermal fuse is used to protect the product from damage.
If improper thermal fuses are used, they may be blown off when they should not, or they may not be blown off when they should. This may cause breakdown of the unit. Be careful to the use conditions and handling.

[Thermal fuse construction]

There are two kinds of thermal fuses: One utilizes melting of easily melting alloy, and the other utilizes the temperature change point of organic matter. Among the latter, those which utilizes a spring that disconnects the contact when crystal organic matter melts are superior in accuracy of blowing and stability. They are called the crystal melting type thermal fuse, which are described in the following.
The crystal melting type thermal fuse is in hermetically sealed construction. The organic matter differs according to the operating temperature. If sealing is degraded, the organic matter may absorb moisture or sublimate to change the characteristics. Lead wire B is connected to the case.

Crystal melting type thermal fuse construction



[Operation]

When the temperature rises above a certain level, the organic matter melts and the spring operates to disconnect star-shape contact from lead wire A, thus opening between lead wire A and lead wire B (metal case).

[Note for handling]

① Attachment
When lead wire A is bent as shown in Fig. 1, lead wire A may make contact with the case and the circuit may not be opened even though the fuse is blown off. Therefore, attach as shown in Fig. 2 or Fig. 3. (Though lead wire A is covered with insulation tube, it may be broken by aging.)

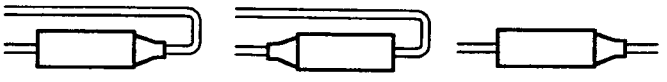
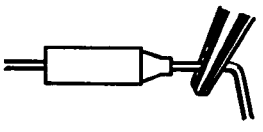


Fig. 1 Fig. 2 Fig. 3

② Lead wire bending
i) Since the lead wires are extremely weak in bending, avoid bending them. (If the lead wires are bent at right angels several times, they may be cut off.)
ii) If there is some necessity to bend the lead wires, fix the base portion of lead wire with pliers so that no force may be exerted to the base portion. (If not, a clearance may be produced in the hermetically sealed construction and the lead wire may come off.)

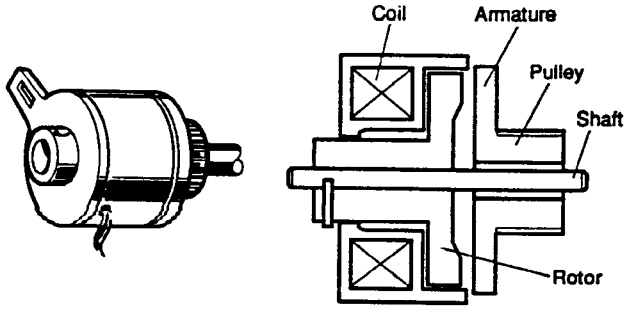


③ Connection
When connecting the lead wire by pressing or by tightening with a screw, be careful not to exert a force to the base portion of the wire. Avoid soldering the lead wire because the operating temperature of the lead wire is lower than the soldering temperature.

④ Deformation of fuse
Do not deform the thermal fuse or do not use deformed thermal fuse. Deformation on the thermal fuse may affect the blowing characteristics.

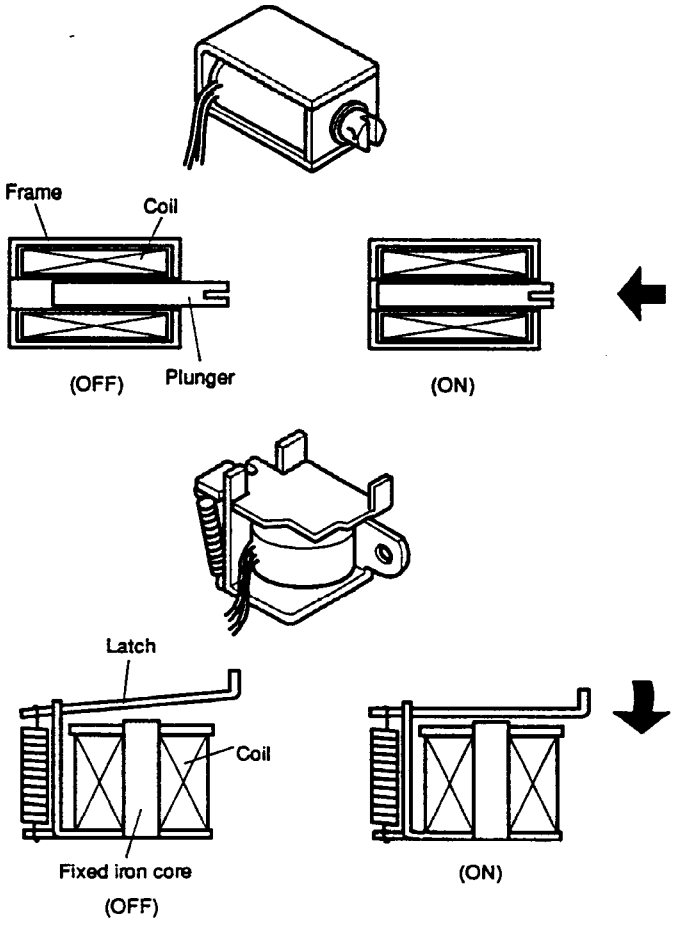
[Electromagnetic clutch]

The electromagnetic supplies a current to the internal coil to generate magnetic force and attract the armature plate, transmitting rotating movement.



[Solenoid]

The solenoid supplies a current to the internal coil to generate magnetic force and attract the plunger, converting electric energy into mechanical energy.



[Motor]

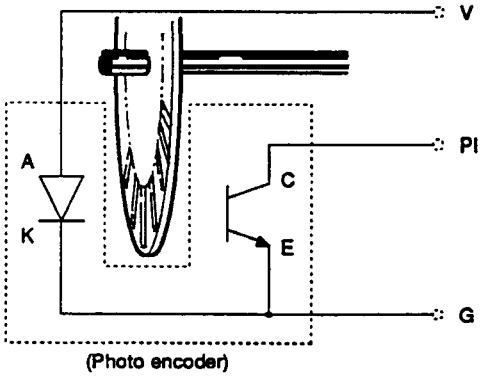
The motor supplies a current to the internal coil to generate magnetic field, and utilizes repulsive force to rotate.
The electrical energy is thus converted into mechanical energy.

[Motor speed detection]

- Digital system

(Detection with a photo encoder)

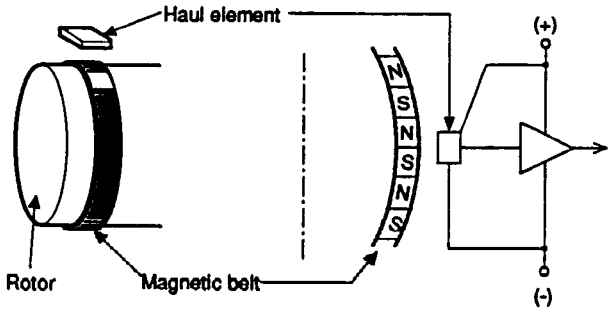
A slit disk is placed between photo interrupters so that the motor speed is detected by on/off signal of LED light.



(Photo encoder)

(Detection with a rotary encoder (RE))

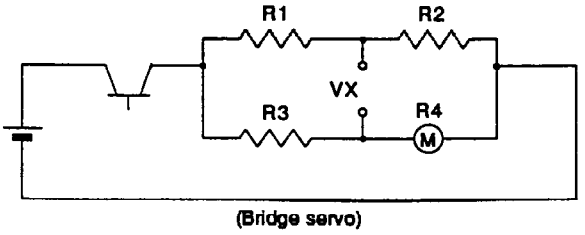
The motor speed is detected by the magnetic sensor (Haul element). In those which have no rotary encoders (RE), position sensors (PS) are used instead.



- Analog system

(The counterelectromotive force is used to detect the motor speed.)

Under the condition of R3 x R2 = R1 x R4 (internal resistance of the motor), a voltage is applied and the motor is rotated to generate a counterelectromotive force (VX) which is in proportion to the motor speed.
The drive voltage is adjusted to maintain the bridge output voltage at a constant level.



(Bridge servo)

[Motor speed control system]

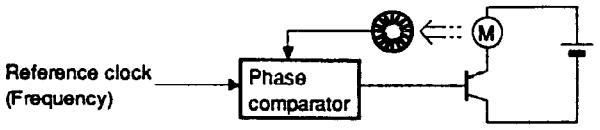
DC motor: Motor speed is controlled by changing the power voltage.

AC motor: Motor speed ic controlled by changing frequency (f) with the frequency convertor (invertor circuit, etc.).

$$RPM\ (N) = \frac{120x(f)}{P(Phase)}$$

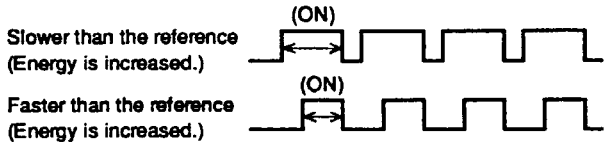
• PLL control system

The reference clock (crystal, etc.) phase and the rotary encoder (RE) output phase are compared to detect the difference in speeds and control (PWM control) the current supplied to the motor, maintaining the motor speed at a constant level.



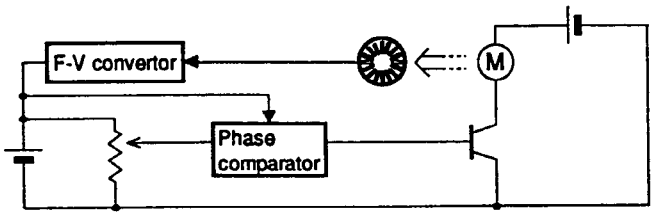
(PWM control)

The PWM control is one of the control methods of electric energy applied to the load, and is used to control a switching power or a motor. (The ON width of current is changed by switching to change energy applied to the motor.)



• F-V control system

The reference voltage for setting the motor speed and the rotary encoder (RE) output signal whose voltage is converted
are compared to detect difference in speed and control (PWM control) a current flowing through the motor, maintaining the motor speed at a constant level.

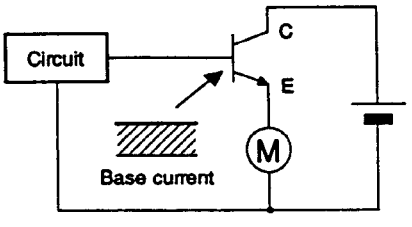


• Servo amplifier system

A voltage and a current which includes control amount are supplied to the motor. Transistor and power MOS FET of high control efficiency are used.

(Linear control): The active area of transistor is used.

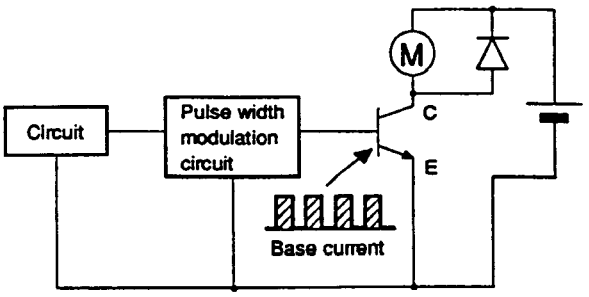
Since the active area of transistor is used, power dissipation of control transistor is large. Since it is of low efficiency, it is used for small capacity motor control.

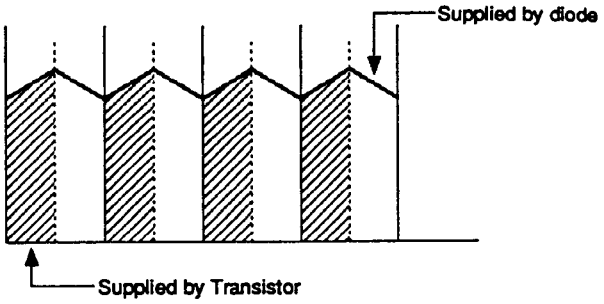


(Pulse width modulation control)

Area between the saturated area and the active area of transistor is used.

Since the switching which uses the saturated area and the active area of transistor is used, the control efficiency is high. It can be used for small capacity and large capacity motors.





When transistor is ON:
Current Transistor Motor (rotation) output
Motor (Inductance L) charge
When transistor is OFF:
Motor (rotation) output
Motor (inductance L)

[12] Copy quality adjustment

Copy check is required at every maintenance call.

1. Image skew

1.5mm, maximum

2. Void area and image loss

Make a copy in the normal mode and check to see that the void area and the image loss are within the given limits.

Side margin void area	5 to 8 mm
Lead edge image loss	−2.5±1.5mm
Side margin image loss	3.3 to 9.7mm
Trail edge image loss	10mm, max.

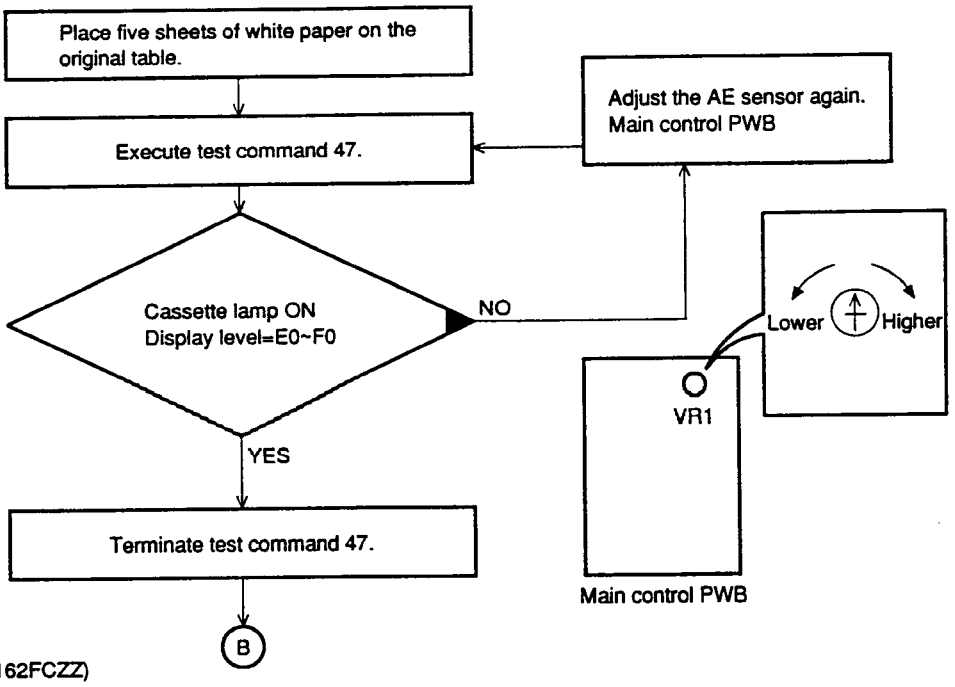
3. Resolution

Make one copy in the enlarge mode (x1.4), normal mode (x1.0), and reduce modes (x0.8, x0.7 or x0.75, x 0.64).
Check to see that resolution is within the limits below.

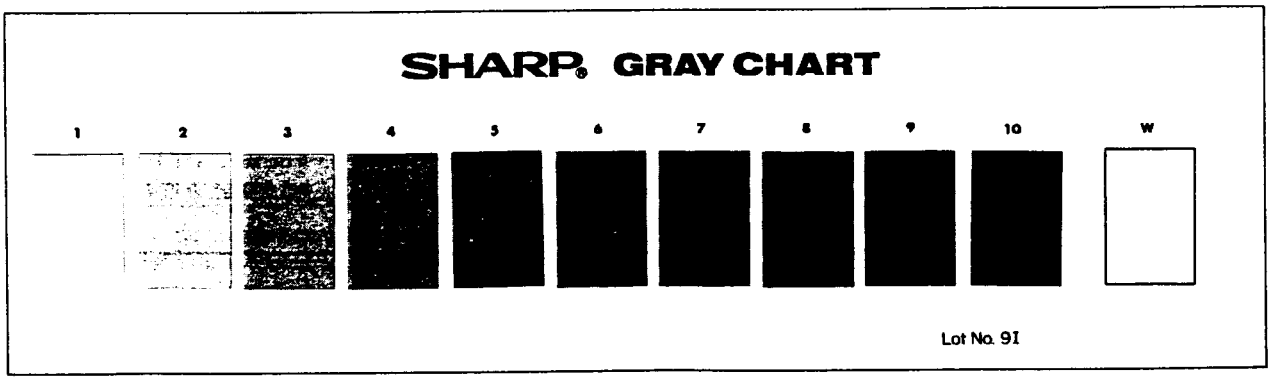
	Center of copy	Corner of copy
Normal mode (100%)	5.0 lines/mm	4.5 lines/mm
Enlarge mode (124%)	5.0 lines/mm	4.5 lines/mm
Reduce mode (80%, 75%)	4.0 lines/mm	3.6 lines/mm
Reduce mode (70%, 64%)	4.0 lines/mm	3.6 lines/mm

4. Exposure adjustment

① Confirming the AE sensor level



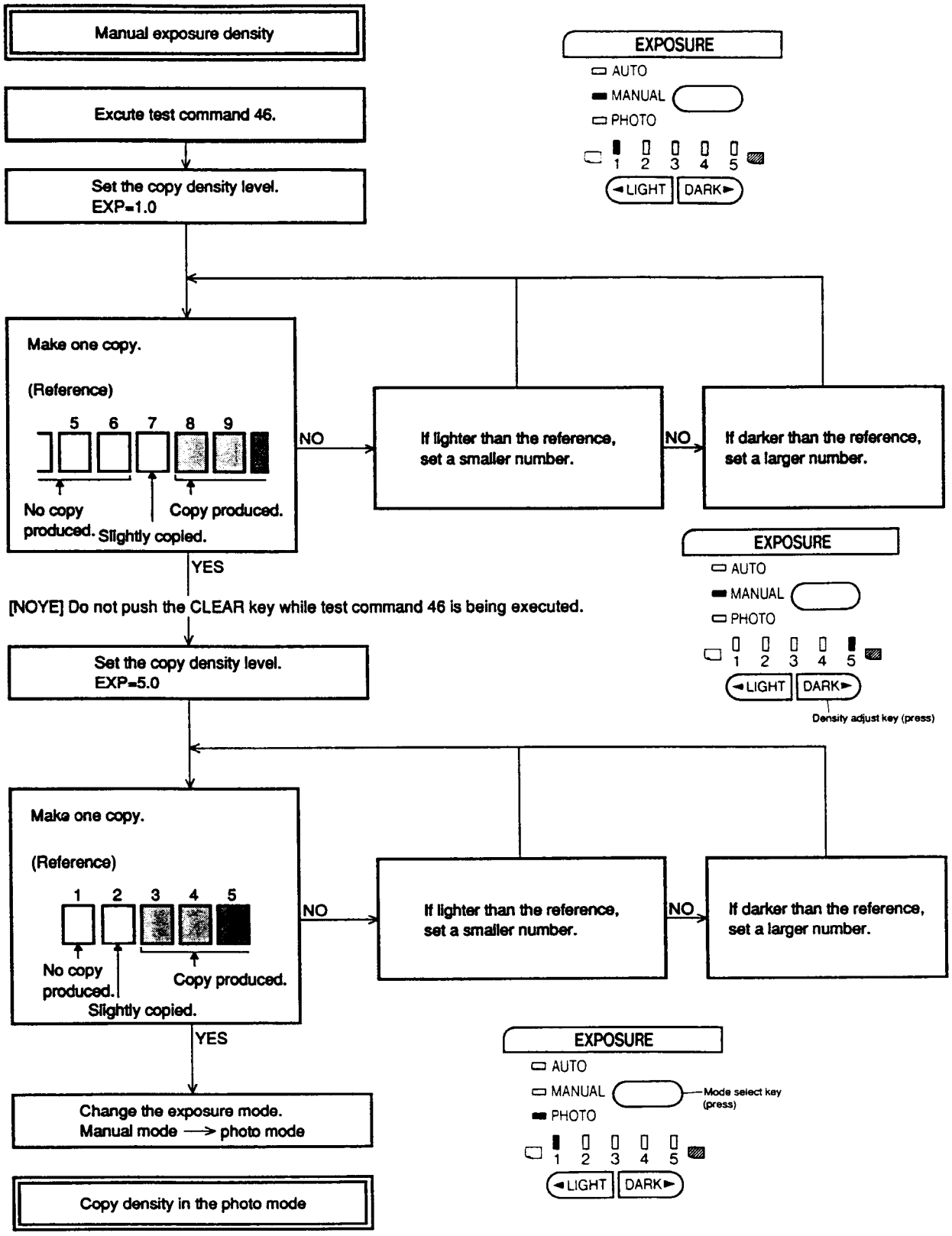
② Placing the test chart (UKOG-0162FCZZ)



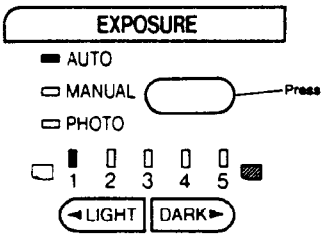
UKOG-0162FCZZ DENSITY No.	1	2	3	4	5	6	7	8	9	10		W
UKOG-0089CSZZ DENSITY No.	0.1		0.2		0.3				0.5	1.9		0
KODAK GRAY SCAL		1		2		3		4		19		A

SHARP CORPORATION
MADE IN JAPAN

③ Confirming copy density



(Because the reference value and re-adjustment are same as the manual exposure adjustment, no description is given here.Refer to the manual exposure density check method.



Change the exposure mode.
Photo → auto mode

Copy density in the auto mode

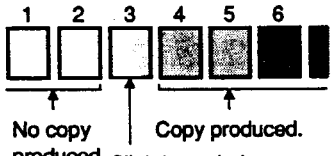
Confilm the copy density level.
EXP=1.0

Confilm the copy number window.
Set to "0".

Change the copy density level.
Exposure level: EXP=1 → EXP=5.

Make one copy.

(Reference)



NO

If lighter than the reference, set a smaller number.

NO

If darker than the reference, set a larger number.

YES

Change the exposure mode.
auto mode → auto CPC mode

Density in the auto exposure mode (CPC)

(Because the reference value and re-adjustment are same as the automatic exposure adjustment, no description is given here.Refer to the automatic exposure density check method.

Terminate test command 46.

CAUTION FOR BATTERY REPLACEMENT

(Danish) ADVARSEL !

Lithiumbatteri – Eksplosionsfare ved fejlagtig håndterig.
Udskiftning må kun ske med batteri
af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandoren.

(English) Caution !

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type
recommended by the equipment manufactuer.
Discard used batteries according to manufacturer's instructions.

(Finnish) VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan
tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden
mukaisesti.